# WORLDWIDE PDB

## PROTEIN DATA BANK

# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 14, 2023 – 12:28 AM JST

| | | |
|---|---|---|
| PDB ID | : | 5YKC |
| Title | : | crystal structure of H5 hemagglutinin from A/chicken/Taiwan/0502/2012 |
| Authors | : | Lin, T.H.; Lee, M.S.; Wu, W.G. |
| Deposited on | : | 2017-10-13 |
| Resolution | : | 2.82 Å(reported) |

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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The following versions of software and data (see references ⓘ) were used in the production of this report:

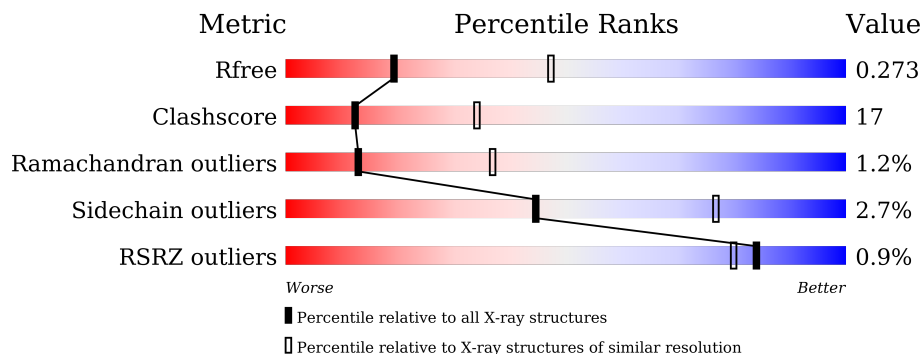| | | |
|---|---|---|
| MolProbity | : | 4.02b-467 |
| Mogul | : | 1.8.5 (274361), CSD as541be (2020) |
| Xtriage (Phenix) | : | 1.13 |
| EDS | : | 2.36 |
| buster-report | : | 1.1.7 (2018) |
| Percentile statistics | : | 20191225.v01 (using entries in the PDB archive December 25th 2019) |
| Refmac | : | 5.8.0158 |
| CCP4 | : | 7.0.044 (Gargrove) |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.36 |

# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.82 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.

| Metric | Percentile Ranks | Value |
|--------|------------------|-------|
| Rfree | | 0.273 |
| Clashscore | | 17 |
| Ramachandran outliers | | 1.2% |
| Sidechain outliers | | 2.7% |
| RSRZ outliers | | 0.9% |

Worse                                                                 Better

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|--------|--------------------------|----------------------------------------------------|
| $R_{free}$ | 130704 | 3617 (2.84-2.80) |
| Clashscore | 141614 | 4060 (2.84-2.80) |
| Ramachandran outliers | 138981 | 3978 (2.84-2.80) |
| Sidechain outliers | 138945 | 3980 (2.84-2.80) |
| RSRZ outliers | 127900 | 3552 (2.84-2.80) |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 1 | A | 586 | .% / 56% / 27% · 15% |
| 1 | B | 586 | .% / 58% / 26% · 15% |
| 1 | C | 586 | .% / 55% / 28% · 16% |
| 2 | D | 2 | 100% |

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit crite-

ria:

| Mol | Type | Chain | Res | Chirality | Geometry | Clashes | Electron density |
|-----|------|-------|-----|-----------|----------|---------|------------------|
| 3 | NAG | B | 602 | - | - | - | X |
| 3 | NAG | C | 604 | - | - | - | X |

# 2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 12092 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Hemagglutinin.

| Mol | Chain | Residues | Atoms | | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A | 496 | Total 3963 | C 2486 | N 694 | O 760 | S 23 | 0 | 0 | 0 |
| 1 | B | 497 | Total 3971 | C 2492 | N 695 | O 761 | S 23 | 0 | 0 | 0 |
| 1 | C | 495 | Total 3958 | C 2483 | N 693 | O 759 | S 23 | 0 | 0 | 0 |

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



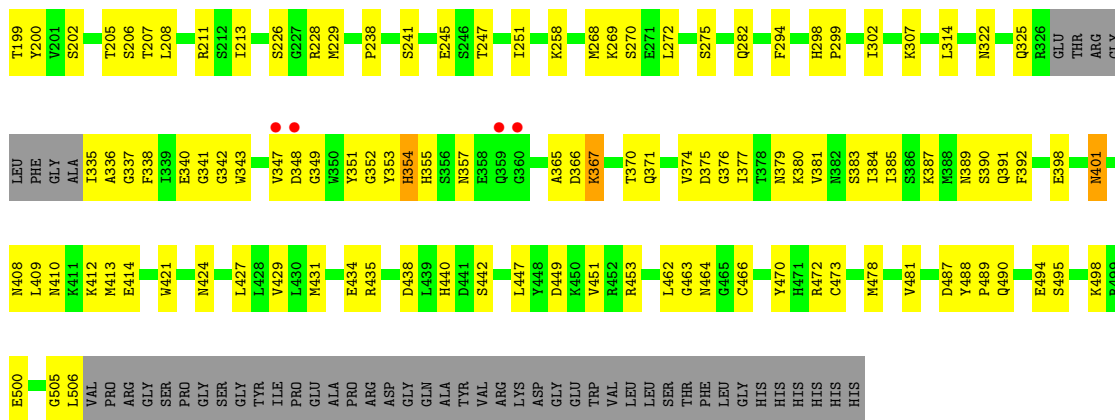| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf | Trace |
|---|---|---|---|---|---|---|---|---|---|
| 2 | D | 2 | Total 28 | C 16 | N 2 | O 10 | 0 | 0 | 0 |

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).
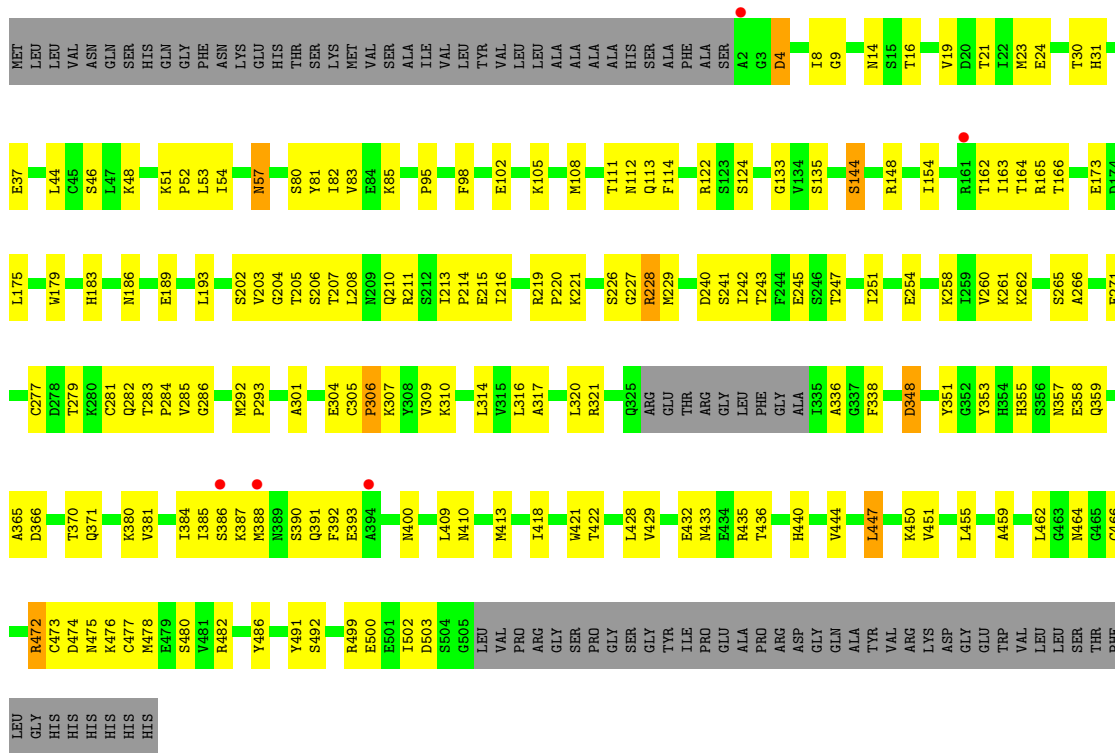
NAG

O6
OH

O5
O1
HO
C6

C1(R)    C5(R)

C2(R)    C4(S)
N2
C3(R)
HN
OH
O4

C7
OH

C8
O
O3

O7

| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf |
|---|---|---|---|---|---|---|---|---|
| 3 | A | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | A | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | A | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | B | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | B | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | B | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | B | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | B | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | C | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | C | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | C | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |
| 3 | C | 1 | Total | C | N | O | 0 | 0 |
| | | | 14 | 8 | 1 | 5 | | |

- Molecule 4 is water.

| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---------|---------|
| 4 | A | 4 | Total 4 | O 4 | 0 | 0 |

# 3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: Hemagglutinin



• Molecule 1: Hemagglutinin

T199 Y200 V201 S202 T205 S206 T207 L208 R211 S212 I213 S226 G227 R228 M229 P238 S241 E245 S246 T247 I251 K258 M268 K269 S270 E271 L272 S275 Q282 F294 H298 P299 I302 K307 L314 N322 Q325 R326 GLU THR ARG GLY

LEU PHE GLY ALA I335 A336 G337 F338 I339 E340 G341 G342 W343 V347 D348 G349 W350 Y351 G352 Y353 H354 H355 S356 N357 E358 Q359 G360 A365 D366 K367 T370 Q371 V374 D375 G376 I377 T378 N379 K380 V381 N382 S383 I384 I385 S386 K387 M388 N389 S390 Q391 F392 E398 N401

N408 L409 N410 K411 K412 M413 E414 W421 N424 L427 L428 V429 L430 M431 E434 R435 D438 L439 H440 D441 S442 L447 Y448 D449 K450 V451 R452 R453 L462 G463 N464 G485 C466 Y470 H471 R472 C473 M478 V481 D487 Y488 P489 Q490 E494 S495 K498 R499

E500 G505 L506 VAL PRO ARG GLY SER PRO GLY SER GLY TYR ILE PRO GLU ALA PRO ARG ASP GLY GLN ALA TYR VAL ARG LYS ASP GLY GLU TRP VAL LEU LEU SER THR PHE LEU GLY HIS HIS HIS HIS HIS HIS

• Molecule 1: Hemagglutinin

Chain C:



MET LEU LEU VAL ASN GLN SER HIS GLN GLY PHE ASN LYS GLU HIS THR SER LYS MET VAL SER ALA ILE VAL LEU TYR VAL LEU LEU ALA ALA ALA ALA HIS SER ALA PHE ALA SER A2 G3 D4 I8 G9 N14 S15 T16 V19 D20 T21 I22 M23 E24 T30 H31

E37 L44 C45 S46 L47 K48 K51 P52 L53 I54 N57 S80 Y81 I82 V83 E84 K85 P95 F98 E102 K105 M108 T111 N112 Q113 F114 R122 S123 S124 G133 V134 S135 S144 R148 I154 R161 T162 I163 T164 R165 T166 E173 D174

L175 W179 H183 N186 E189 L193 S202 V203 Q204 T205 S206 T207 L208 N209 Q210 R211 S212 I213 P214 E215 I216 R219 P220 K221 S226 G227 R228 M229 D240 S241 I242 T243 F244 E245 S246 T247 I251 E254 K258 I259 V260 K261 K262 S265 A266 E271

C277 D278 T279 K280 C281 Q282 T283 P284 V285 G286 M292 P293 A301 E304 C305 P306 K307 Y308 V309 K310 L314 V315 L316 A317 L320 R321 Q325 ARG GLU THR ARG GLY LEU PHE GLY ALA I335 A336 G337 F338 D348 Y351 G352 Y353 H354 H355 S356 N357 E358 Q359

A365 D366 T370 Q371 K380 V381 I384 I385 S386 K387 M388 N389 S390 Q391 F392 E393 A394 N400 L409 N410 M413 I418 W421 T422 L428 V429 E432 N433 E434 R435 T436 H440 V444 L447 K450 V451 L455 A459 L462 G463 N464 G465 C466

R472 C473 D474 N475 K476 C477 M478 E479 S480 V481 R482 Y486 Y491 S492 R499 E500 E501 I502 D503 S504 G505 LEU VAL PRO ARG GLY SER PRO GLY SER GLY TYR ILE PRO GLU ALA PRO ARG ASP GLY GLN ALA TYR VAL ARG LYS ASP GLY GLU TRP VAL LEU LEU SER THR PHE

LEU GLY HIS HIS HIS HIS HIS HIS

• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc
opyranose

Chain D:



NAG1 NAG2

# 4 Data and refinement statistics ⓘ

| Property | Value | Source |
|---|---|---|
| Space group | C 2 2 21 | Depositor |
| Cell constants<br>a, b, c, $\alpha$, $\beta$, $\gamma$ | 110.42Å 220.10Å 186.51Å<br>90.00° 90.00° 90.00° | Depositor |
| Resolution (Å) | 29.04 – 2.82<br>29.04 – 2.82 | Depositor<br>EDS |
| % Data completeness<br>(in resolution range) | 85.5 (29.04-2.82)<br>85.5 (29.04-2.82) | Depositor<br>EDS |
| $R_{merge}$ | 0.07 | Depositor |
| $R_{sym}$ | (Not available) | Depositor |
| $< I/\sigma(I) >$ [1] | 5.33 (at 2.80Å) | Xtriage |
| Refinement program | PHENIX (1.11.1_2575: ???) | Depositor |
| R, $R_{free}$ | 0.197 , 0.273<br>0.197 , 0.273 | Depositor<br>DCC |
| $R_{free}$ test set | 2431 reflections (5.19%) | wwPDB-VP |
| Wilson B-factor (Å²) | 49.9 | Xtriage |
| Anisotropy | 0.326 | Xtriage |
| Bulk solvent $k_{sol}$(e/Å³), $B_{sol}$(Å²) | 0.30 , 40.7 | EDS |
| L-test for twinning[2] | $< |L| > = 0.48, < L^2 > = 0.31$ | Xtriage |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| $F_o$,$F_c$ correlation | 0.92 | EDS |
| Total number of atoms | 12092 | wwPDB-VP |
| Average B, all atoms (Å²) | 61.0 | wwPDB-VP |

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.92% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

# 5 Model quality ⓘ

## 5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: NAG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Chain | Bond lengths | | Bond angles | |
|-----|-------|------|---------|------|---------|
| | | RMSZ | #$|Z|$>5 | RMSZ | #$|Z|$>5 |
| 1 | A | 0.50 | 0/4052 | 0.65 | 0/5480 |
| 1 | B | 0.51 | 0/4060 | 0.66 | 0/5491 |
| 1 | C | 0.48 | 0/4047 | 0.65 | 0/5473 |
| All | All | 0.50 | 0/12159 | 0.65 | 0/16444 |

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1 | A | 3963 | 0 | 3827 | 126 | 0 |
| 1 | B | 3971 | 0 | 3831 | 133 | 0 |
| 1 | C | 3958 | 0 | 3821 | 163 | 0 |
| 2 | D | 28 | 0 | 25 | 0 | 0 |
| 3 | A | 42 | 0 | 39 | 0 | 0 |
| 3 | B | 70 | 0 | 65 | 1 | 0 |
| 3 | C | 56 | 0 | 52 | 8 | 0 |
| 4 | A | 4 | 0 | 0 | 0 | 0 |
| All | All | 12092 | 0 | 11660 | 399 | 0 |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including

hydrogen atoms). The all-atom clashscore for this structure is 17.

All (399) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:307:LYS:CG | 1:C:391:GLN:HE21 | 1.68 | 1.06 |
| 1:B:21:THR:HB | 1:B:434:GLU:HG2 | 1.39 | 1.04 |
| 1:C:205:THR:HG22 | 1:C:207:THR:H | 1.21 | 1.01 |
| 1:A:380:LYS:NZ | 1:A:432:GLU:OE1 | 1.97 | 0.96 |
| 1:B:487:ASP:HB3 | 1:B:490:GLN:HE21 | 1.34 | 0.91 |
| 1:C:307:LYS:HG3 | 1:C:391:GLN:HE21 | 1.38 | 0.89 |
| 1:A:423:TYR:HD2 | 1:C:388:MET:HG3 | 1.36 | 0.88 |
| 1:C:14:ASN:HD22 | 3:C:603:NAG:C1 | 1.84 | 0.86 |
| 1:A:423:TYR:CD2 | 1:C:388:MET:HG3 | 2.12 | 0.85 |
| 1:B:23:MET:HB3 | 1:B:434:GLU:OE2 | 1.78 | 0.84 |
| 1:C:57:ASN:CG | 3:C:601:NAG:C1 | 2.47 | 0.83 |
| 1:C:477:CYS:HA | 1:C:480:SER:HB3 | 1.59 | 0.83 |
| 1:C:279:THR:HG22 | 1:C:281:CYS:H | 1.43 | 0.83 |
| 1:C:477:CYS:SG | 1:C:491:TYR:OH | 2.37 | 0.82 |
| 1:B:105:LYS:NZ | 1:B:398:GLU:OE1 | 2.12 | 0.81 |
| 1:B:44:LEU:HD13 | 1:B:272:LEU:HB2 | 1.61 | 0.81 |
| 1:C:57:ASN:OD1 | 3:C:601:NAG:C1 | 2.28 | 0.81 |
| 1:C:455:LEU:HD13 | 1:C:459:ALA:HB3 | 1.62 | 0.80 |
| 1:B:462:LEU:HB2 | 1:B:464:ASN:HD22 | 1.47 | 0.78 |
| 1:C:46:SER:HB2 | 1:C:51:LYS:HA | 1.66 | 0.77 |
| 1:C:293:PRO:HB3 | 1:C:385:ILE:HG23 | 1.66 | 0.77 |
| 1:B:13:ASN:O | 1:B:322:ASN:ND2 | 2.17 | 0.77 |
| 1:C:57:ASN:ND2 | 1:C:85:LYS:NZ | 2.33 | 0.76 |
| 1:A:395:VAL:HG21 | 1:B:412:LYS:HE3 | 1.67 | 0.76 |
| 1:A:44:LEU:HA | 1:A:282:GLN:NE2 | 2.01 | 0.76 |
| 1:B:371:GLN:HA | 1:B:374:VAL:HG12 | 1.66 | 0.76 |
| 1:B:7:CYS:HB2 | 1:B:354:HIS:HB3 | 1.67 | 0.76 |
| 1:C:57:ASN:HD21 | 3:C:601:NAG:C1 | 1.98 | 0.75 |
| 1:C:305:CYS:HB2 | 1:C:306:PRO:HD2 | 1.69 | 0.75 |
| 1:B:8:ILE:HD13 | 1:B:447:LEU:HD12 | 1.69 | 0.75 |
| 1:C:52:PRO:HG2 | 1:C:54:ILE:HD11 | 1.67 | 0.75 |
| 1:C:307:LYS:CG | 1:C:391:GLN:NE2 | 2.50 | 0.74 |
| 1:A:336:ALA:HB3 | 1:A:340:GLU:HG2 | 1.71 | 0.73 |
| 1:B:205:THR:HG22 | 1:B:208:LEU:HB3 | 1.71 | 0.72 |
| 1:A:293:PRO:HB3 | 1:A:385:ILE:HG23 | 1.69 | 0.72 |
| 1:B:8:ILE:HD13 | 1:B:447:LEU:CD1 | 2.20 | 0.72 |
| 1:B:487:ASP:HB3 | 1:B:490:GLN:NE2 | 2.03 | 0.72 |
| 1:C:283:THR:HG22 | 1:C:285:VAL:H | 1.52 | 0.72 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:409:LEU:HD13 | 1:C:410:ASN:HD22 | 1.55 | 0.71 |
| 1:C:307:LYS:HG3 | 1:C:391:GLN:NE2 | 2.04 | 0.71 |
| 1:C:282:GLN:OE1 | 1:C:283:THR:N | 2.23 | 0.71 |
| 1:B:470:TYR:O | 1:B:498:LYS:HG3 | 1.89 | 0.71 |
| 1:C:21:THR:HG22 | 1:C:23:MET:H | 1.55 | 0.71 |
| 1:C:24:GLU:OE1 | 1:C:321:ARG:NH2 | 2.25 | 0.70 |
| 1:A:48:LYS:HD3 | 1:A:280:LYS:HG3 | 1.73 | 0.70 |
| 1:B:462:LEU:HB2 | 1:B:464:ASN:ND2 | 2.08 | 0.69 |
| 1:C:310:LYS:H | 1:C:422:THR:HG21 | 1.57 | 0.69 |
| 1:B:21:THR:HB | 1:B:434:GLU:CG | 2.21 | 0.69 |
| 1:A:397:LYS:NZ | 1:B:408:ASN:OD1 | 2.25 | 0.69 |
| 1:C:57:ASN:ND2 | 1:C:85:LYS:HZ1 | 1.90 | 0.69 |
| 1:C:30:THR:HG22 | 1:C:31:HIS:CD2 | 2.28 | 0.69 |
| 1:A:391:GLN:HG2 | 1:A:392:PHE:H | 1.56 | 0.68 |
| 1:C:279:THR:HG22 | 1:C:281:CYS:N | 2.07 | 0.68 |
| 1:C:283:THR:HB | 1:C:286:GLY:O | 1.93 | 0.68 |
| 1:C:474:ASP:O | 1:C:476:LYS:N | 2.27 | 0.68 |
| 1:C:307:LYS:CB | 1:C:391:GLN:HE21 | 2.08 | 0.67 |
| 1:C:44:LEU:HA | 1:C:282:GLN:NE2 | 2.09 | 0.67 |
| 1:B:391:GLN:HG3 | 1:B:421:TRP:CD2 | 2.30 | 0.67 |
| 1:B:8:ILE:CD1 | 1:B:447:LEU:HD12 | 2.24 | 0.66 |
| 1:A:307:LYS:HB3 | 1:A:391:GLN:NE2 | 2.10 | 0.66 |
| 1:C:279:THR:CG2 | 1:C:281:CYS:H | 2.07 | 0.66 |
| 1:C:391:GLN:OE1 | 1:C:421:TRP:HB3 | 1.95 | 0.66 |
| 1:A:353:TYR:HE2 | 1:A:451:VAL:HG21 | 1.61 | 0.66 |
| 1:A:359:GLN:HE22 | 1:A:474:ASP:HB2 | 1.61 | 0.66 |
| 1:B:381:VAL:O | 1:B:385:ILE:HD12 | 1.98 | 0.64 |
| 1:C:462:LEU:O | 1:C:462:LEU:HD23 | 1.97 | 0.64 |
| 1:C:37:GLU:HB2 | 1:C:292:MET:HG3 | 1.80 | 0.64 |
| 1:A:17:THR:HG21 | 1:A:32:ALA:HB3 | 1.80 | 0.64 |
| 1:B:391:GLN:HG2 | 1:B:392:PHE:H | 1.63 | 0.64 |
| 1:C:380:LYS:O | 1:C:384:ILE:HG13 | 1.97 | 0.64 |
| 1:A:72:GLU:HG3 | 1:A:148:ARG:NH1 | 2.12 | 0.63 |
| 1:B:383:SER:O | 1:B:387:LYS:HG2 | 1.98 | 0.63 |
| 1:C:203:VAL:HG22 | 1:C:210:GLN:HG2 | 1.80 | 0.63 |
| 1:B:8:ILE:CD1 | 1:B:447:LEU:CD1 | 2.76 | 0.63 |
| 1:C:24:GLU:CD | 1:C:321:ARG:HH22 | 2.02 | 0.63 |
| 1:B:377:ILE:HD12 | 1:C:23:MET:HE1 | 1.79 | 0.62 |
| 1:C:357:ASN:ND2 | 1:C:473:CYS:O | 2.31 | 0.62 |
| 1:A:122:ARG:NH2 | 1:A:254:GLU:OE2 | 2.33 | 0.62 |
| 1:B:427:LEU:O | 1:B:431:MET:HG3 | 1.99 | 0.62 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:129:ASP:HB3 | 1:B:154:ILE:HB | 1.82 | 0.61 |
| 1:A:410:ASN:HB2 | 1:B:409:LEU:HD11 | 1.82 | 0.61 |
| 1:B:205:THR:HG23 | 1:B:207:THR:H | 1.65 | 0.61 |
| 1:C:173:GLU:CD | 1:C:258:LYS:HD2 | 2.20 | 0.61 |
| 1:C:57:ASN:HD21 | 3:C:601:NAG:C2 | 2.14 | 0.61 |
| 1:A:184:PRO:HD2 | 1:A:216:ILE:HG12 | 1.83 | 0.61 |
| 1:C:307:LYS:CG | 1:C:391:GLN:HG2 | 2.31 | 0.61 |
| 1:B:17:THR:HG21 | 1:B:32:ALA:HB3 | 1.81 | 0.60 |
| 1:C:166:THR:OG1 | 1:C:243:THR:HG23 | 2.01 | 0.60 |
| 1:A:367:LYS:HA | 1:A:370:THR:HG22 | 1.83 | 0.60 |
| 1:A:199:THR:HG21 | 1:A:249:ASN:OD1 | 2.01 | 0.60 |
| 1:B:435:ARG:HE | 1:C:435:ARG:NH2 | 2.00 | 0.60 |
| 1:B:205:THR:HG22 | 1:B:208:LEU:H | 1.66 | 0.60 |
| 1:C:432:GLU:O | 1:C:436:THR:HG23 | 2.02 | 0.60 |
| 1:C:113:GLN:HB3 | 1:C:260:VAL:HG23 | 1.83 | 0.59 |
| 1:B:85:LYS:O | 1:B:269:LYS:NZ | 2.36 | 0.59 |
| 1:B:314:LEU:HD11 | 1:B:429:VAL:HG21 | 1.85 | 0.59 |
| 1:A:453:ARG:HB3 | 1:B:463:GLY:HA3 | 1.83 | 0.59 |
| 1:A:68:PRO:HB3 | 1:A:140:TYR:HB2 | 1.85 | 0.59 |
| 1:C:348:ASP:HB2 | 1:C:365:ALA:HB2 | 1.84 | 0.58 |
| 1:B:9:GLY:HA2 | 1:B:338:PHE:HB3 | 1.84 | 0.58 |
| 1:C:179:TRP:CZ2 | 1:C:203:VAL:HG21 | 2.38 | 0.58 |
| 1:A:462:LEU:HD11 | 1:A:468:GLU:HB2 | 1.86 | 0.58 |
| 1:B:8:ILE:CG1 | 1:B:447:LEU:HD12 | 2.34 | 0.58 |
| 1:C:307:LYS:HG3 | 1:C:391:GLN:HG2 | 1.83 | 0.58 |
| 1:C:204:GLY:O | 1:C:242:ILE:HA | 2.02 | 0.58 |
| 1:B:447:LEU:HD13 | 1:B:447:LEU:O | 2.03 | 0.58 |
| 1:A:490:GLN:O | 1:A:490:GLN:HG2 | 2.03 | 0.58 |
| 1:B:56:LYS:NZ | 1:B:85:LYS:NZ | 2.52 | 0.57 |
| 1:A:160:TYR:CZ | 1:A:248:GLY:HA2 | 2.39 | 0.57 |
| 1:C:57:ASN:OD1 | 3:C:601:NAG:O5 | 2.22 | 0.57 |
| 1:C:307:LYS:HG2 | 1:C:391:GLN:HE21 | 1.66 | 0.57 |
| 1:A:35:ILE:O | 1:A:293:PRO:HD2 | 2.04 | 0.57 |
| 1:A:8:ILE:HG13 | 1:A:448:TYR:HA | 1.86 | 0.57 |
| 1:C:162:THR:HG22 | 1:C:247:THR:HG22 | 1.86 | 0.57 |
| 1:C:219:ARG:NH1 | 1:C:227:GLY:HA2 | 2.20 | 0.57 |
| 1:A:141:ASN:O | 1:A:141:ASN:ND2 | 2.38 | 0.56 |
| 1:B:22:ILE:HG22 | 1:B:434:GLU:HG3 | 1.85 | 0.56 |
| 1:B:10:TYR:OH | 1:B:341:GLY:HA2 | 2.05 | 0.56 |
| 1:A:70:CYS:O | 1:A:148:ARG:NH2 | 2.35 | 0.56 |
| 1:C:307:LYS:HG2 | 1:C:391:GLN:HB3 | 1.88 | 0.56 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:366:ASP:O | 1:C:370:THR:HG22 | 2.06 | 0.56 |
| 1:C:310:LYS:H | 1:C:422:THR:CG2 | 2.18 | 0.56 |
| 1:A:129:ASP:HB3 | 1:A:154:ILE:HB | 1.89 | 0.55 |
| 1:A:178:ILE:O | 1:A:253:PRO:HB3 | 2.05 | 0.55 |
| 1:C:205:THR:HB | 1:C:208:LEU:HB3 | 1.87 | 0.55 |
| 1:C:320:LEU:HD13 | 1:C:440:HIS:HB3 | 1.87 | 0.55 |
| 1:C:474:ASP:O | 1:C:477:CYS:N | 2.39 | 0.55 |
| 1:C:455:LEU:HD13 | 1:C:459:ALA:CB | 2.35 | 0.55 |
| 1:C:351:TYR:CD1 | 1:C:444:VAL:HG12 | 2.42 | 0.54 |
| 1:C:316:LEU:HD23 | 1:C:381:VAL:HG23 | 1.89 | 0.54 |
| 1:B:335:ILE:HG23 | 1:B:336:ALA:H | 1.72 | 0.54 |
| 1:C:57:ASN:HD22 | 1:C:85:LYS:HZ1 | 1.56 | 0.54 |
| 1:A:410:ASN:HB2 | 1:B:409:LEU:CD1 | 2.37 | 0.54 |
| 1:C:30:THR:N | 1:C:320:LEU:O | 2.37 | 0.54 |
| 1:B:488:TYR:HB3 | 1:B:489:PRO:HD3 | 1.90 | 0.54 |
| 1:C:53:LEU:HD23 | 1:C:82:ILE:HG12 | 1.90 | 0.54 |
| 1:A:155:LYS:HE3 | 1:A:158:ASN:HA | 1.89 | 0.54 |
| 1:B:174:ASP:OD1 | 1:B:238:PRO:HD3 | 2.08 | 0.54 |
| 1:A:391:GLN:HG3 | 1:A:421:TRP:CD2 | 2.43 | 0.54 |
| 1:A:298:HIS:CE1 | 1:A:300:PHE:H | 2.26 | 0.54 |
| 1:A:435:ARG:HG2 | 1:A:435:ARG:HH11 | 1.73 | 0.53 |
| 1:A:117:ILE:HD11 | 1:A:175:LEU:HD21 | 1.89 | 0.53 |
| 1:A:185:ASN:ND2 | 1:A:227:GLY:N | 2.55 | 0.53 |
| 1:C:57:ASN:ND2 | 1:C:85:LYS:HZ3 | 2.03 | 0.53 |
| 1:C:336:ALA:O | 1:C:464:ASN:ND2 | 2.41 | 0.53 |
| 1:A:220:PRO:O | 1:A:228:ARG:NH1 | 2.39 | 0.53 |
| 1:A:427:LEU:HD11 | 1:C:428:LEU:HD13 | 1.91 | 0.53 |
| 1:C:108:MET:O | 1:C:111:THR:HG22 | 2.09 | 0.53 |
| 1:C:173:GLU:HB2 | 1:C:258:LYS:CG | 2.37 | 0.53 |
| 1:A:391:GLN:HG2 | 1:A:392:PHE:N | 2.24 | 0.53 |
| 1:B:8:ILE:HG12 | 1:B:447:LEU:HD12 | 1.91 | 0.53 |
| 1:A:380:LYS:HZ3 | 1:A:432:GLU:HB3 | 1.74 | 0.53 |
| 1:A:401:ASN:OD1 | 1:A:401:ASN:N | 2.41 | 0.53 |
| 1:B:349:GLY:HA2 | 1:B:370:THR:HG21 | 1.89 | 0.53 |
| 1:A:13:ASN:OD1 | 1:A:14:ASN:N | 2.42 | 0.53 |
| 1:A:194:TYR:O | 1:A:196:ASN:N | 2.42 | 0.52 |
| 1:A:189:GLU:OE2 | 1:A:192:LYS:NZ | 2.40 | 0.52 |
| 1:B:347:VAL:HG23 | 1:B:348:ASP:H | 1.74 | 0.52 |
| 1:C:24:GLU:OE2 | 1:C:321:ARG:NH2 | 2.43 | 0.52 |
| 1:B:380:LYS:HD3 | 1:C:23:MET:HE2 | 1.91 | 0.52 |
| 1:A:13:ASN:OD1 | 1:A:15:SER:N | 2.40 | 0.52 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:183:HIS:CE1 | 1:C:215:GLU:H | 2.27 | 0.52 |
| 1:B:464:ASN:ND2 | 1:B:466:CYS:H | 2.07 | 0.52 |
| 1:C:229:MET:HE1 | 1:C:251:ILE:HG12 | 1.91 | 0.52 |
| 1:A:279:THR:HG21 | 1:A:282:GLN:HG2 | 1.91 | 0.52 |
| 1:C:154:ILE:HD12 | 1:C:193:LEU:HD22 | 1.90 | 0.52 |
| 1:A:164:THR:HA | 1:A:244:PHE:O | 2.09 | 0.52 |
| 1:B:431:MET:O | 1:B:435:ARG:NH2 | 2.43 | 0.52 |
| 1:B:307:LYS:HE3 | 1:B:389:ASN:HA | 1.91 | 0.52 |
| 1:C:173:GLU:OE1 | 1:C:173:GLU:N | 2.43 | 0.52 |
| 1:B:56:LYS:NZ | 1:B:85:LYS:HZ3 | 2.08 | 0.51 |
| 1:A:94:TYR:CD1 | 1:A:229:MET:HG3 | 2.45 | 0.51 |
| 1:C:359:GLN:OE1 | 1:C:474:ASP:HB2 | 2.10 | 0.51 |
| 1:A:22:ILE:HD11 | 1:A:431:MET:HA | 1.91 | 0.51 |
| 1:A:395:VAL:CG2 | 1:B:412:LYS:HE3 | 2.39 | 0.51 |
| 1:C:219:ARG:HB3 | 1:C:228:ARG:NH2 | 2.25 | 0.51 |
| 1:A:168:ASN:OD1 | 1:A:241:SER:HB3 | 2.11 | 0.51 |
| 1:B:182:HIS:HB2 | 1:B:251:ILE:HD11 | 1.92 | 0.51 |
| 1:C:455:LEU:HD12 | 1:C:455:LEU:O | 2.11 | 0.51 |
| 1:A:413:MET:HB3 | 1:C:413:MET:SD | 2.51 | 0.51 |
| 1:B:155:LYS:O | 1:B:155:LYS:HG2 | 2.10 | 0.51 |
| 1:C:108:MET:HA | 1:C:111:THR:HG22 | 1.92 | 0.51 |
| 1:B:478:MET:O | 1:B:481:VAL:HG12 | 2.11 | 0.50 |
| 1:A:335:ILE:HD12 | 1:A:354:HIS:CE1 | 2.46 | 0.50 |
| 1:B:169:ASN:ND2 | 1:B:171:ASN:OD1 | 2.45 | 0.50 |
| 1:A:374:VAL:O | 1:A:378:THR:HG22 | 2.11 | 0.50 |
| 1:B:56:LYS:HZ1 | 1:B:85:LYS:HZ3 | 1.59 | 0.50 |
| 1:B:96:GLY:HA3 | 1:B:229:MET:O | 2.10 | 0.50 |
| 1:A:480:SER:OG | 1:A:485:THR:O | 2.29 | 0.50 |
| 1:C:57:ASN:HD21 | 3:C:601:NAG:H2 | 1.76 | 0.50 |
| 1:C:473:CYS:SG | 1:C:477:CYS:HB3 | 2.52 | 0.50 |
| 1:B:8:ILE:HD11 | 1:B:451:VAL:HG21 | 1.93 | 0.50 |
| 1:B:61:ALA:HB2 | 1:B:101:TYR:CE1 | 2.46 | 0.50 |
| 1:B:391:GLN:HG2 | 1:B:392:PHE:N | 2.27 | 0.50 |
| 1:C:124:SER:OG | 1:C:165:ARG:NH1 | 2.45 | 0.50 |
| 1:B:211:ARG:CZ | 1:C:216:ILE:HG23 | 2.41 | 0.49 |
| 1:B:335:ILE:HG23 | 1:B:336:ALA:N | 2.27 | 0.49 |
| 1:B:202:SER:N | 1:B:245:GLU:O | 2.42 | 0.49 |
| 1:A:179:TRP:CZ2 | 1:A:203:VAL:HG21 | 2.48 | 0.49 |
| 1:A:229:MET:CE | 1:A:251:ILE:HD11 | 2.42 | 0.49 |
| 1:C:355:HIS:HD2 | 1:C:478:MET:HG3 | 1.77 | 0.49 |
| 1:A:435:ARG:HG2 | 1:A:435:ARG:NH1 | 2.28 | 0.49 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:307:LYS:HB3 | 1:A:391:GLN:CD | 2.33 | 0.49 |
| 1:B:380:LYS:HD3 | 1:C:23:MET:CE | 2.43 | 0.49 |
| 1:C:418:ILE:O | 1:C:422:THR:HG23 | 2.13 | 0.49 |
| 1:B:56:LYS:HG2 | 3:B:603:NAG:H82 | 1.94 | 0.48 |
| 1:C:163:ILE:O | 1:C:245:GLU:HA | 2.12 | 0.48 |
| 1:A:359:GLN:N | 1:A:359:GLN:OE1 | 2.46 | 0.48 |
| 1:C:304:GLU:O | 1:C:304:GLU:HG3 | 2.12 | 0.48 |
| 1:A:473:CYS:O | 1:A:477:CYS:HB3 | 2.14 | 0.48 |
| 1:A:125:TRP:CD2 | 1:A:153:LEU:HD11 | 2.48 | 0.48 |
| 1:B:8:ILE:CG2 | 1:B:447:LEU:HD12 | 2.44 | 0.48 |
| 1:B:353:TYR:CE2 | 1:B:447:LEU:HD11 | 2.49 | 0.48 |
| 1:C:221:LYS:HG2 | 1:C:226:SER:OG | 2.14 | 0.48 |
| 1:A:44:LEU:HA | 1:A:282:GLN:HE22 | 1.73 | 0.48 |
| 1:A:401:ASN:O | 1:A:402:LEU:HB2 | 2.14 | 0.48 |
| 1:B:8:ILE:HD13 | 1:B:447:LEU:HD13 | 1.96 | 0.48 |
| 1:C:24:GLU:CD | 1:C:321:ARG:NH2 | 2.66 | 0.48 |
| 1:C:85:LYS:HD2 | 1:C:271:GLU:HG3 | 1.96 | 0.48 |
| 1:C:213:ILE:HG13 | 1:C:214:PRO:HD2 | 1.95 | 0.48 |
| 1:A:13:ASN:ND2 | 1:A:30:THR:HB | 2.29 | 0.47 |
| 1:B:199:THR:O | 1:B:213:ILE:HG23 | 2.14 | 0.47 |
| 1:B:355:HIS:HB2 | 1:B:478:MET:SD | 2.54 | 0.47 |
| 1:B:495:SER:O | 1:B:498:LYS:HB2 | 2.14 | 0.47 |
| 1:B:325:GLN:HB2 | 1:B:340:GLU:OE2 | 2.14 | 0.47 |
| 1:B:401:ASN:N | 1:B:401:ASN:OD1 | 2.46 | 0.47 |
| 1:C:9:GLY:HA2 | 1:C:338:PHE:HB3 | 1.95 | 0.47 |
| 1:C:307:LYS:CG | 1:C:391:GLN:CG | 2.92 | 0.47 |
| 1:B:133:GLY:HA3 | 1:B:152:TRP:HB3 | 1.96 | 0.47 |
| 1:C:317:ALA:H | 1:C:433:ASN:ND2 | 2.12 | 0.47 |
| 1:C:353:TYR:CD1 | 1:C:482:ARG:HD2 | 2.49 | 0.47 |
| 1:C:478:MET:O | 1:C:482:ARG:HG3 | 2.13 | 0.47 |
| 1:B:12:ALA:HB2 | 1:B:342:GLY:HA3 | 1.95 | 0.47 |
| 1:A:12:ALA:HB1 | 1:A:324:PRO:HG3 | 1.96 | 0.47 |
| 1:B:435:ARG:HA | 1:B:438:ASP:HB2 | 1.96 | 0.47 |
| 1:C:14:ASN:ND2 | 3:C:603:NAG:O5 | 2.37 | 0.47 |
| 1:C:279:THR:HG21 | 1:C:281:CYS:O | 2.13 | 0.47 |
| 1:B:351:TYR:OH | 1:B:440:HIS:ND1 | 2.43 | 0.47 |
| 1:C:293:PRO:HG3 | 1:C:385:ILE:HD13 | 1.97 | 0.47 |
| 1:A:115:GLU:O | 1:A:258:LYS:HG3 | 2.15 | 0.47 |
| 1:C:102:GLU:OE2 | 1:C:400:ASN:HB3 | 2.14 | 0.47 |
| 1:A:94:TYR:CE2 | 1:A:225:GLN:HG2 | 2.50 | 0.46 |
| 1:A:163:ILE:O | 1:A:245:GLU:HA | 2.15 | 0.46 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:B:488:TYR:O | 1:B:490:GLN:N | 2.45 | 0.46 |
| 1:C:281:CYS:SG | 1:C:301:ALA:HB1 | 2.55 | 0.46 |
| 1:C:111:THR:HA | 1:C:262:LYS:HA | 1.96 | 0.46 |
| 1:C:283:THR:HG22 | 1:C:285:VAL:HG22 | 1.97 | 0.46 |
| 1:A:60:VAL:HG23 | 1:A:84:GLU:OE2 | 2.16 | 0.46 |
| 1:B:500:GLU:OE1 | 1:C:503:ASP:HB3 | 2.16 | 0.46 |
| 1:A:132:SER:O | 1:A:134:VAL:HG22 | 2.15 | 0.46 |
| 1:A:380:LYS:HZ1 | 1:A:432:GLU:CD | 2.11 | 0.46 |
| 1:A:320:LEU:HD12 | 1:A:320:LEU:N | 2.31 | 0.46 |
| 1:B:194:TYR:O | 1:B:196:ASN:N | 2.49 | 0.46 |
| 1:A:217:ALA:HB2 | 1:C:202:SER:HB2 | 1.98 | 0.46 |
| 1:C:19:VAL:HG21 | 1:C:317:ALA:HB2 | 1.98 | 0.46 |
| 1:C:164:THR:O | 1:C:165:ARG:HG2 | 2.17 | 0.46 |
| 1:C:480:SER:OG | 1:C:486:TYR:HA | 2.16 | 0.46 |
| 1:A:96:GLY:HA3 | 1:A:229:MET:O | 2.17 | 0.45 |
| 1:B:47:LEU:HD12 | 1:B:47:LEU:HA | 1.73 | 0.45 |
| 1:A:185:ASN:ND2 | 1:A:226:SER:C | 2.69 | 0.45 |
| 1:B:43:ARG:HD2 | 1:B:275:SER:OG | 2.16 | 0.45 |
| 1:B:391:GLN:HG3 | 1:B:421:TRP:CE3 | 2.51 | 0.45 |
| 1:B:380:LYS:HB2 | 1:C:23:MET:HA | 1.98 | 0.45 |
| 1:B:505:GLY:O | 1:B:506:LEU:HD12 | 2.17 | 0.45 |
| 1:C:54:ILE:HG13 | 1:C:83:VAL:CG1 | 2.46 | 0.45 |
| 1:A:220:PRO:HG3 | 1:C:241:SER:OG | 2.17 | 0.45 |
| 1:A:290:SER:HB2 | 1:A:306:PRO:HD3 | 1.99 | 0.45 |
| 1:B:200:TYR:H | 1:B:247:THR:HG22 | 1.80 | 0.45 |
| 1:C:48:LYS:HZ1 | 1:C:304:GLU:HG2 | 1.82 | 0.45 |
| 1:B:494:GLU:O | 1:B:498:LYS:HG2 | 2.17 | 0.45 |
| 1:C:355:HIS:CD2 | 1:C:478:MET:HG3 | 2.51 | 0.45 |
| 1:C:357:ASN:OD1 | 1:C:358:GLU:N | 2.48 | 0.45 |
| 1:C:387:LYS:HE2 | 1:C:387:LYS:HB2 | 1.78 | 0.45 |
| 1:B:4:ASP:OD1 | 1:B:472:ARG:NH1 | 2.50 | 0.45 |
| 1:B:56:LYS:HZ2 | 1:B:85:LYS:NZ | 2.14 | 0.45 |
| 1:B:228:ARG:HA | 1:B:228:ARG:HD3 | 1.68 | 0.45 |
| 1:C:80:SER:HG | 1:C:81:TYR:HD1 | 1.62 | 0.45 |
| 1:A:353:TYR:HE2 | 1:A:451:VAL:CG2 | 2.27 | 0.45 |
| 1:C:384:ILE:HG23 | 1:C:428:LEU:HD21 | 1.98 | 0.45 |
| 1:A:174:ASP:O | 1:A:259:ILE:HD12 | 2.17 | 0.45 |
| 1:C:95:PRO:HB2 | 1:C:228:ARG:HD3 | 1.99 | 0.45 |
| 1:A:354:HIS:CE1 | 1:A:361:SER:HB2 | 2.52 | 0.45 |
| 1:A:377:ILE:O | 1:A:381:VAL:HG23 | 2.17 | 0.45 |
| 1:B:447:LEU:HD13 | 1:B:447:LEU:C | 2.37 | 0.45 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:C:135:SER:O | 1:C:144:SER:HA | 2.17 | 0.45 |
| 1:C:499:ARG:O | 1:C:502:ILE:HG22 | 2.17 | 0.45 |
| 1:C:21:THR:HG22 | 1:C:23:MET:N | 2.28 | 0.44 |
| 1:A:357:ASN:HD22 | 1:A:474:ASP:HA | 1.81 | 0.44 |
| 1:A:376:GLY:O | 1:A:379:ASN:HB2 | 2.17 | 0.44 |
| 1:B:337:GLY:HA2 | 1:B:343:TRP:HZ2 | 1.82 | 0.44 |
| 1:B:410:ASN:O | 1:B:414:GLU:HG3 | 2.16 | 0.44 |
| 1:C:186:ASN:HB2 | 1:C:189:GLU:H | 1.82 | 0.44 |
| 1:C:314:LEU:HD12 | 1:C:314:LEU:HA | 1.82 | 0.44 |
| 1:A:219:ARG:HH22 | 1:A:227:GLY:HA2 | 1.82 | 0.44 |
| 1:A:457:ASP:OD1 | 1:A:488:TYR:HE1 | 2.00 | 0.44 |
| 1:C:283:THR:HG23 | 1:C:284:PRO:HD2 | 1.99 | 0.44 |
| 1:C:179:TRP:CE2 | 1:C:203:VAL:HG11 | 2.51 | 0.44 |
| 1:A:80:SER:HB2 | 1:A:81:TYR:HD1 | 1.82 | 0.44 |
| 1:A:298:HIS:HE1 | 1:A:300:PHE:HB2 | 1.83 | 0.44 |
| 1:B:449:ASP:O | 1:B:453:ARG:HG2 | 2.17 | 0.44 |
| 1:C:175:LEU:HD12 | 1:C:175:LEU:HA | 1.73 | 0.44 |
| 1:A:298:HIS:HE1 | 1:A:300:PHE:CD2 | 2.36 | 0.44 |
| 1:B:473:CYS:HB3 | 1:B:478:MET:CE | 2.48 | 0.44 |
| 1:C:54:ILE:HD12 | 1:C:54:ILE:N | 2.33 | 0.44 |
| 1:C:450:LYS:HB2 | 1:C:450:LYS:HE3 | 1.76 | 0.44 |
| 1:A:477:CYS:O | 1:A:480:SER:HB3 | 2.18 | 0.44 |
| 1:C:320:LEU:CD1 | 1:C:440:HIS:HB3 | 2.48 | 0.44 |
| 1:C:451:VAL:O | 1:C:455:LEU:HG | 2.18 | 0.44 |
| 1:A:54:ILE:HG22 | 1:A:56:LYS:H | 1.83 | 0.43 |
| 1:A:124:SER:OG | 1:A:165:ARG:NH2 | 2.36 | 0.43 |
| 1:A:179:TRP:CE2 | 1:A:203:VAL:HG21 | 2.53 | 0.43 |
| 1:B:94:TYR:CD1 | 1:B:229:MET:HG3 | 2.54 | 0.43 |
| 1:C:8:ILE:HD12 | 1:C:447:LEU:HG | 2.00 | 0.43 |
| 1:C:203:VAL:HG23 | 1:C:208:LEU:HD23 | 2.00 | 0.43 |
| 1:C:283:THR:CG2 | 1:C:285:VAL:HG22 | 2.47 | 0.43 |
| 1:A:179:TRP:CE2 | 1:A:232:PHE:HB2 | 2.52 | 0.43 |
| 1:B:367:LYS:O | 1:B:367:LYS:HD3 | 2.17 | 0.43 |
| 1:B:464:ASN:OD1 | 1:B:466:CYS:SG | 2.76 | 0.43 |
| 1:C:357:ASN:ND2 | 1:C:474:ASP:HB3 | 2.33 | 0.43 |
| 1:C:455:LEU:CD1 | 1:C:459:ALA:HB3 | 2.39 | 0.43 |
| 1:A:97:THR:CG2 | 1:A:230:GLU:HG3 | 2.48 | 0.43 |
| 1:A:354:HIS:HE1 | 1:A:361:SER:HB2 | 1.83 | 0.43 |
| 1:A:436:THR:O | 1:A:439:LEU:HB3 | 2.18 | 0.43 |
| 1:A:458:ASN:HD21 | 1:A:492:SER:HA | 1.83 | 0.43 |
| 1:C:105:LYS:HA | 1:C:108:MET:HG3 | 1.99 | 0.43 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:166:THR:OG1 | 1:A:243:THR:HB | 2.18 | 0.43 |
| 1:B:196:ASN:HA | 1:B:197:PRO:HD3 | 1.85 | 0.43 |
| 1:B:473:CYS:HB3 | 1:B:478:MET:HE3 | 2.01 | 0.43 |
| 1:B:314:LEU:HD12 | 1:B:314:LEU:HA | 1.67 | 0.43 |
| 1:B:337:GLY:HA2 | 1:B:343:TRP:CZ2 | 2.52 | 0.43 |
| 1:C:112:ASN:N | 1:C:261:LYS:O | 2.40 | 0.43 |
| 1:A:185:ASN:HD21 | 1:A:227:GLY:N | 2.15 | 0.43 |
| 1:A:380:LYS:O | 1:A:384:ILE:HD13 | 2.18 | 0.43 |
| 1:B:36:LEU:HD12 | 1:B:294:PHE:HB3 | 2.01 | 0.43 |
| 1:B:380:LYS:O | 1:B:384:ILE:HD12 | 2.19 | 0.43 |
| 1:C:316:LEU:HD13 | 1:C:429:VAL:HG22 | 2.01 | 0.43 |
| 1:C:357:ASN:ND2 | 1:C:474:ASP:HA | 2.34 | 0.43 |
| 1:A:357:ASN:ND2 | 1:A:474:ASP:HA | 2.34 | 0.43 |
| 1:B:135:SER:C | 1:B:144:SER:HB3 | 2.39 | 0.43 |
| 1:B:205:THR:CG2 | 1:B:208:LEU:HB3 | 2.46 | 0.43 |
| 1:B:47:LEU:HD21 | 1:B:302:ILE:HG22 | 2.01 | 0.43 |
| 1:B:451:VAL:HG13 | 1:B:481:VAL:HG21 | 2.00 | 0.43 |
| 1:C:30:THR:HB | 1:C:320:LEU:H | 1.83 | 0.43 |
| 1:A:94:TYR:CZ | 1:A:225:GLN:HG2 | 2.54 | 0.42 |
| 1:A:353:TYR:CE2 | 1:A:451:VAL:HG21 | 2.46 | 0.42 |
| 1:B:199:THR:HA | 1:B:247:THR:CG2 | 2.49 | 0.42 |
| 1:C:309:VAL:HA | 1:C:422:THR:HG22 | 2.01 | 0.42 |
| 1:A:5:ARG:NE | 1:A:468:GLU:HG3 | 2.34 | 0.42 |
| 1:B:241:SER:OG | 1:C:220:PRO:HG3 | 2.19 | 0.42 |
| 1:A:320:LEU:HD12 | 1:A:320:LEU:H | 1.84 | 0.42 |
| 1:B:45:CYS:H | 1:B:282:GLN:NE2 | 2.17 | 0.42 |
| 1:B:205:THR:HG23 | 1:B:206:SER:N | 2.35 | 0.42 |
| 1:A:474:ASP:O | 1:A:478:MET:HG2 | 2.20 | 0.42 |
| 1:B:371:GLN:HA | 1:B:374:VAL:CG1 | 2.44 | 0.42 |
| 1:B:410:ASN:HA | 1:C:409:LEU:HD11 | 2.01 | 0.42 |
| 1:C:30:THR:HB | 1:C:320:LEU:N | 2.35 | 0.42 |
| 1:B:365:ALA:O | 1:B:367:LYS:N | 2.52 | 0.42 |
| 1:A:229:MET:HE2 | 1:A:251:ILE:HD11 | 2.01 | 0.42 |
| 1:B:67:ASN:HA | 1:B:68:PRO:HD3 | 1.97 | 0.42 |
| 1:B:376:GLY:HA2 | 1:B:379:ASN:HB2 | 2.01 | 0.42 |
| 1:B:185:ASN:HB2 | 1:B:189:GLU:OE2 | 2.20 | 0.41 |
| 1:C:206:SER:OG | 1:C:240:ASP:OD1 | 2.33 | 0.41 |
| 1:C:265:SER:OG | 1:C:266:ALA:N | 2.52 | 0.41 |
| 1:A:44:LEU:HD21 | 1:A:83:VAL:HG21 | 2.02 | 0.41 |
| 1:B:298:HIS:ND1 | 1:B:299:PRO:HD2 | 2.34 | 0.41 |
| 1:A:35:ILE:HD11 | 1:A:429:VAL:HG21 | 2.03 | 0.41 |

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| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|---|---|---|---|
| 1:A:52:PRO:HB3 | 1:A:81:TYR:CE1 | 2.56 | 0.41 |
| 1:A:335:ILE:HD12 | 1:A:354:HIS:NE2 | 2.35 | 0.41 |
| 1:A:457:ASP:OD1 | 1:A:458:ASN:ND2 | 2.54 | 0.41 |
| 1:C:30:THR:O | 1:C:31:HIS:HD2 | 2.04 | 0.41 |
| 1:C:16:THR:O | 1:C:16:THR:OG1 | 2.35 | 0.41 |
| 1:B:117:ILE:HG21 | 1:B:258:LYS:HD2 | 2.03 | 0.41 |
| 1:B:421:TRP:HA | 1:B:424:ASN:HB2 | 2.01 | 0.41 |
| 1:B:435:ARG:NE | 1:C:435:ARG:NH2 | 2.68 | 0.41 |
| 1:C:4:ASP:HB2 | 1:C:472:ARG:HG2 | 2.03 | 0.41 |
| 1:A:111:THR:HG23 | 1:A:259:ILE:HG23 | 2.03 | 0.41 |
| 1:B:128:HIS:HA | 1:B:156:LYS:HB2 | 2.03 | 0.41 |
| 1:A:309:VAL:HG21 | 1:A:311:LEU:HD12 | 2.03 | 0.41 |
| 1:C:44:LEU:HA | 1:C:282:GLN:HE21 | 1.85 | 0.41 |
| 1:A:383:SER:O | 1:A:387:LYS:HE3 | 2.20 | 0.41 |
| 1:C:122:ARG:HG3 | 1:C:254:GLU:CD | 2.42 | 0.41 |
| 1:C:393:GLU:H | 1:C:393:GLU:HG2 | 1.71 | 0.41 |
| 1:B:349:GLY:HA3 | 1:B:365:ALA:HB1 | 2.02 | 0.40 |
| 1:B:494:GLU:HG3 | 1:B:498:LYS:NZ | 2.36 | 0.40 |
| 1:A:22:ILE:H | 1:A:22:ILE:HD12 | 1.86 | 0.40 |
| 1:A:101:TYR:O | 1:A:105:LYS:HG3 | 2.20 | 0.40 |
| 1:A:311:LEU:HD21 | 1:A:426:GLU:HB2 | 2.02 | 0.40 |
| 1:B:413:MET:CE | 1:B:414:GLU:HG2 | 2.51 | 0.40 |
| 1:C:227:GLY:C | 1:C:228:ARG:HG2 | 2.40 | 0.40 |
| 1:C:307:LYS:HG3 | 1:C:391:GLN:CG | 2.49 | 0.40 |
| 1:B:325:GLN:OE1 | 1:B:325:GLN:HA | 2.22 | 0.40 |
| 1:B:185:ASN:OD1 | 1:B:226:SER:HB3 | 2.22 | 0.40 |
| 1:B:268:MET:HE3 | 1:B:268:MET:HB3 | 1.76 | 0.40 |
| 1:A:353:TYR:OH | 1:A:447:LEU:HD11 | 2.22 | 0.40 |
| 1:A:353:TYR:CD1 | 1:A:482:ARG:HG3 | 2.57 | 0.40 |
| 1:A:359:GLN:HE22 | 1:A:474:ASP:CB | 2.29 | 0.40 |
| 1:A:456:ARG:HB3 | 1:A:457:ASP:H | 1.75 | 0.40 |
| 1:B:352:GLY:HA2 | 1:B:365:ALA:HA | 2.04 | 0.40 |
| 1:C:281:CYS:HB2 | 1:C:305:CYS:HB3 | 1.19 | 0.40 |

There are no symmetry-related clashes.

## 5.3  Torsion angles ⓘ

### 5.3.1  Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed | Favoured | Allowed | Outliers | Percentiles | |
|---|---|---|---|---|---|---|---|
| 1 | A | 492/586 (84%) | 457 (93%) | 28 (6%) | 7 (1%) | 11 | 32 |
| 1 | B | 493/586 (84%) | 444 (90%) | 44 (9%) | 5 (1%) | 15 | 42 |
| 1 | C | 491/586 (84%) | 451 (92%) | 34 (7%) | 6 (1%) | 13 | 37 |
| All | All | 1476/1758 (84%) | 1352 (92%) | 106 (7%) | 18 (1%) | 13 | 37 |

All (18) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|---|---|---|---|
| 1 | A | 195 | GLN |
| 1 | A | 474 | ASP |
| 1 | B | 390 | SER |
| 1 | A | 133 | GLY |
| 1 | B | 195 | GLN |
| 1 | C | 144 | SER |
| 1 | C | 392 | PHE |
| 1 | C | 475 | ASN |
| 1 | A | 290 | SER |
| 1 | A | 402 | LEU |
| 1 | C | 133 | GLY |
| 1 | C | 472 | ARG |
| 1 | B | 366 | ASP |
| 1 | C | 306 | PRO |
| 1 | A | 4 | ASP |
| 1 | A | 26 | ASN |
| 1 | B | 133 | GLY |
| 1 | B | 56 | LYS |

### 5.3.2  Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed | Rotameric | Outliers | Percentiles | |
|-----|-------|----------|-----------|----------|-------------|---|
| 1 | A | 438/510 (86%) | 427 (98%) | 11 (2%) | 47 | 78 |
| 1 | B | 439/510 (86%) | 430 (98%) | 9 (2%) | 53 | 82 |
| 1 | C | 438/510 (86%) | 422 (96%) | 16 (4%) | 34 | 66 |
| All | All | 1315/1530 (86%) | 1279 (97%) | 36 (3%) | 44 | 77 |

All (36) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 23 | MET |
| 1 | A | 98 | PHE |
| 1 | A | 143 | ARG |
| 1 | A | 195 | GLN |
| 1 | A | 356 | SER |
| 1 | A | 380 | LYS |
| 1 | A | 388 | MET |
| 1 | A | 427 | LEU |
| 1 | A | 449 | ASP |
| 1 | A | 452 | ARG |
| 1 | A | 490 | GLN |
| 1 | B | 93 | CYS |
| 1 | B | 195 | GLN |
| 1 | B | 270 | SER |
| 1 | B | 354 | HIS |
| 1 | B | 357 | ASN |
| 1 | B | 367 | LYS |
| 1 | B | 375 | ASP |
| 1 | B | 401 | ASN |
| 1 | B | 442 | SER |
| 1 | C | 4 | ASP |
| 1 | C | 57 | ASN |
| 1 | C | 98 | PHE |
| 1 | C | 114 | PHE |
| 1 | C | 148 | ARG |
| 1 | C | 211 | ARG |
| 1 | C | 228 | ARG |
| 1 | C | 277 | CYS |
| 1 | C | 348 | ASP |
| 1 | C | 371 | GLN |
| 1 | C | 386 | SER |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | C | 390 | SER |
| 1 | C | 447 | LEU |
| 1 | C | 466 | CYS |
| 1 | C | 492 | SER |
| 1 | C | 500 | GLU |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1 | A | 99 | ASN |
| 1 | A | 113 | GLN |
| 1 | A | 185 | ASN |
| 1 | A | 325 | GLN |
| 1 | A | 354 | HIS |
| 1 | A | 391 | GLN |
| 1 | A | 458 | ASN |
| 1 | B | 112 | ASN |
| 1 | B | 169 | ASN |
| 1 | B | 171 | ASN |
| 1 | B | 282 | GLN |
| 1 | B | 410 | ASN |
| 1 | B | 464 | ASN |
| 1 | B | 490 | GLN |
| 1 | C | 18 | GLN |
| 1 | C | 31 | HIS |
| 1 | C | 57 | ASN |
| 1 | C | 225 | GLN |
| 1 | C | 354 | HIS |
| 1 | C | 391 | GLN |
| 1 | C | 410 | ASN |
| 1 | C | 433 | ASN |

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates (i)

2 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|-----|------|--------|------|---------|--------|------|---------|
| | | | | | Counts | RMSZ | #$|Z| > 2$ | Counts | RMSZ | #$|Z| > 2$ |
| 2 | NAG | D | 1 | 1,2 | 14,14,15 | 0.19 | 0 | 17,19,21 | 1.11 | 2 (11%) |
| 2 | NAG | D | 2 | 2 | 14,14,15 | 0.76 | 0 | 17,19,21 | 1.41 | 2 (11%) |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|-----|------|-------|-----|------|---------|----------|-------|
| 2 | NAG | D | 1 | 1,2 | - | 4/6/23/26 | 0/1/1/1 |
| 2 | NAG | D | 2 | 2 | - | 3/6/23/26 | 0/1/1/1 |

There are no bond length outliers.

All (4) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed($^o$) | Ideal($^o$) |
|-----|-------|-----|------|-------|-----|-------------|----------|
| 2 | D | 2 | NAG | C1-O5-C5 | 4.31 | 118.03 | 112.19 |
| 2 | D | 1 | NAG | C1-O5-C5 | 3.04 | 116.31 | 112.19 |
| 2 | D | 2 | NAG | C3-C4-C5 | -2.05 | 106.57 | 110.24 |
| 2 | D | 1 | NAG | O4-C4-C5 | 2.02 | 114.32 | 109.30 |

There are no chirality outliers.

All (7) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------|
| 2 | D | 2 | NAG | C4-C5-C6-O6 |
| 2 | D | 2 | NAG | O5-C5-C6-O6 |
| 2 | D | 1 | NAG | O5-C5-C6-O6 |
| 2 | D | 1 | NAG | C4-C5-C6-O6 |

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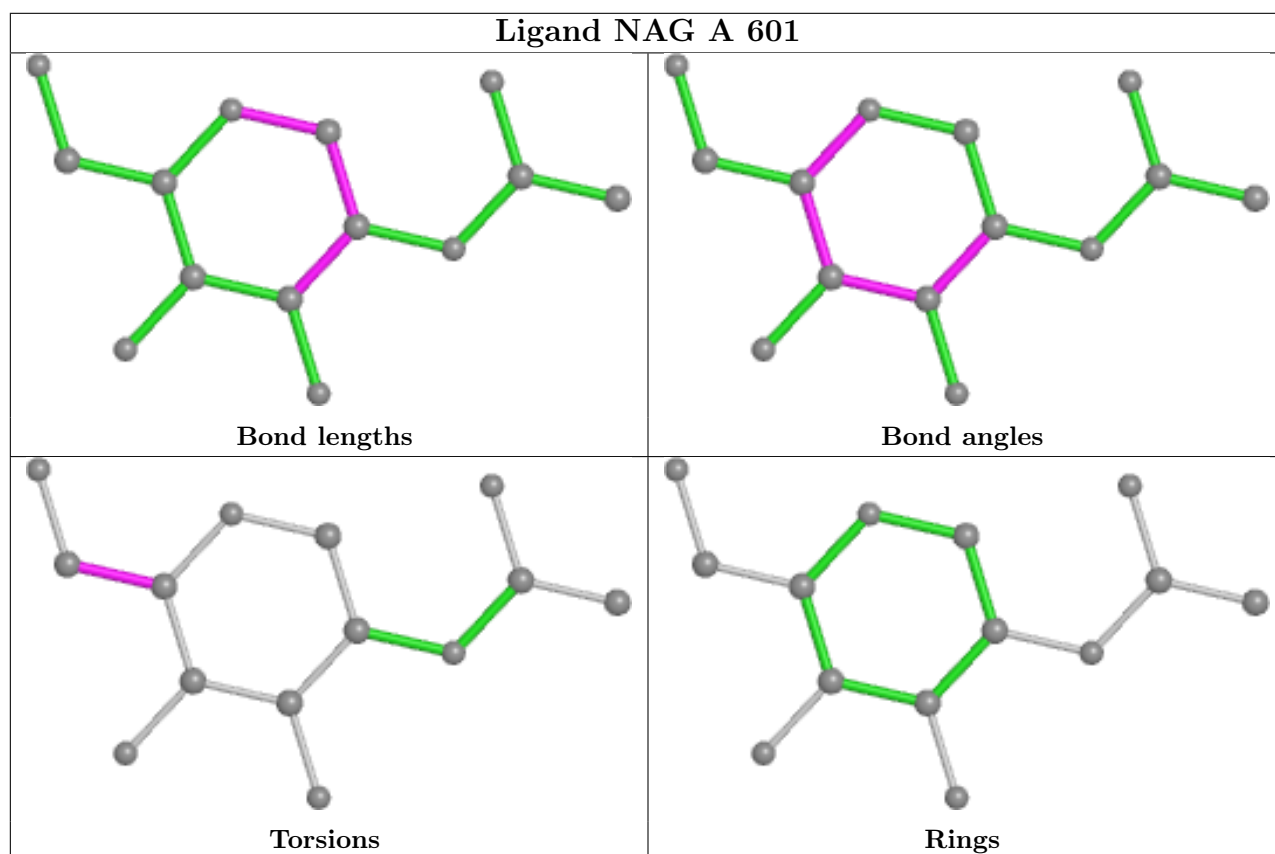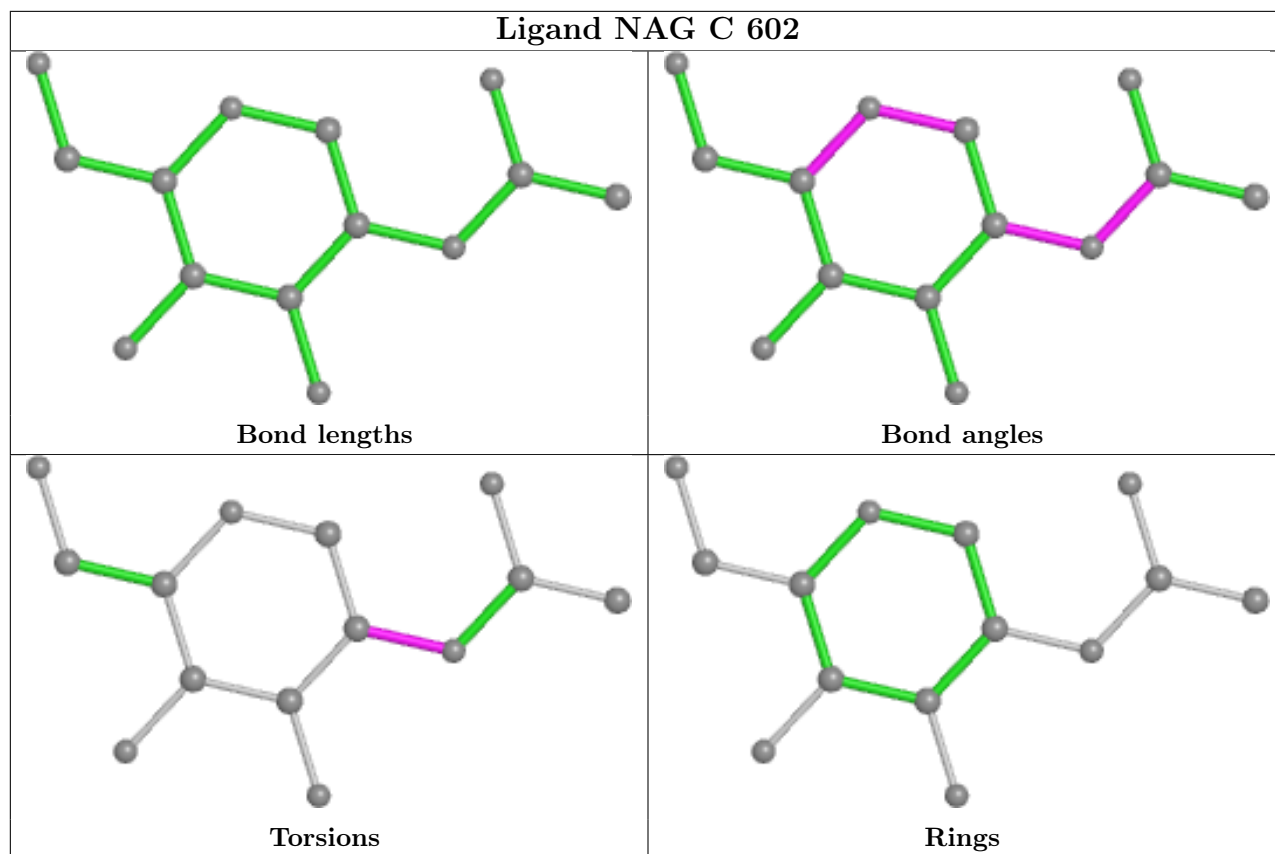| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------|
| 2 | D | 2 | NAG | C3-C2-N2-C7 |
| 2 | D | 1 | NAG | C1-C2-N2-C7 |
| 2 | D | 1 | NAG | C3-C2-N2-C7 |

There are no ring outliers.

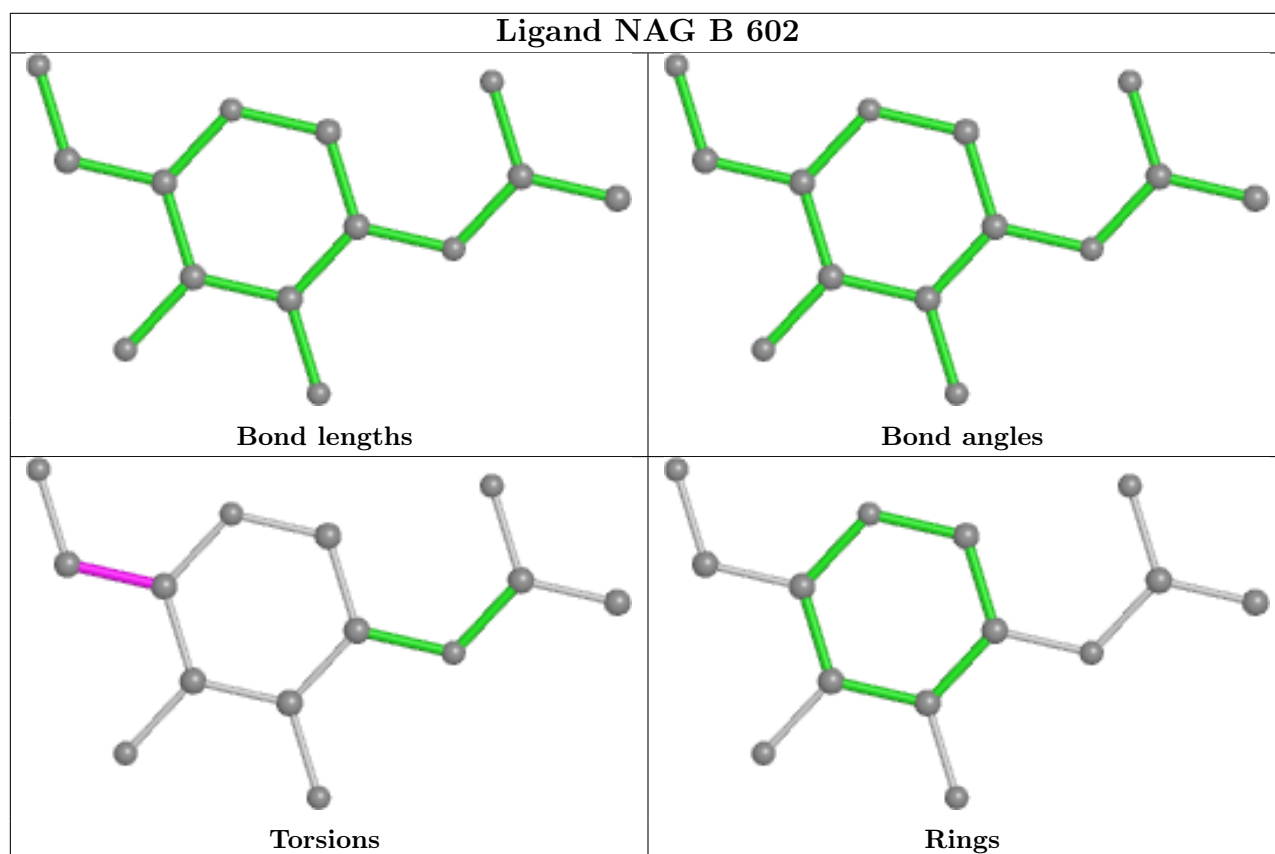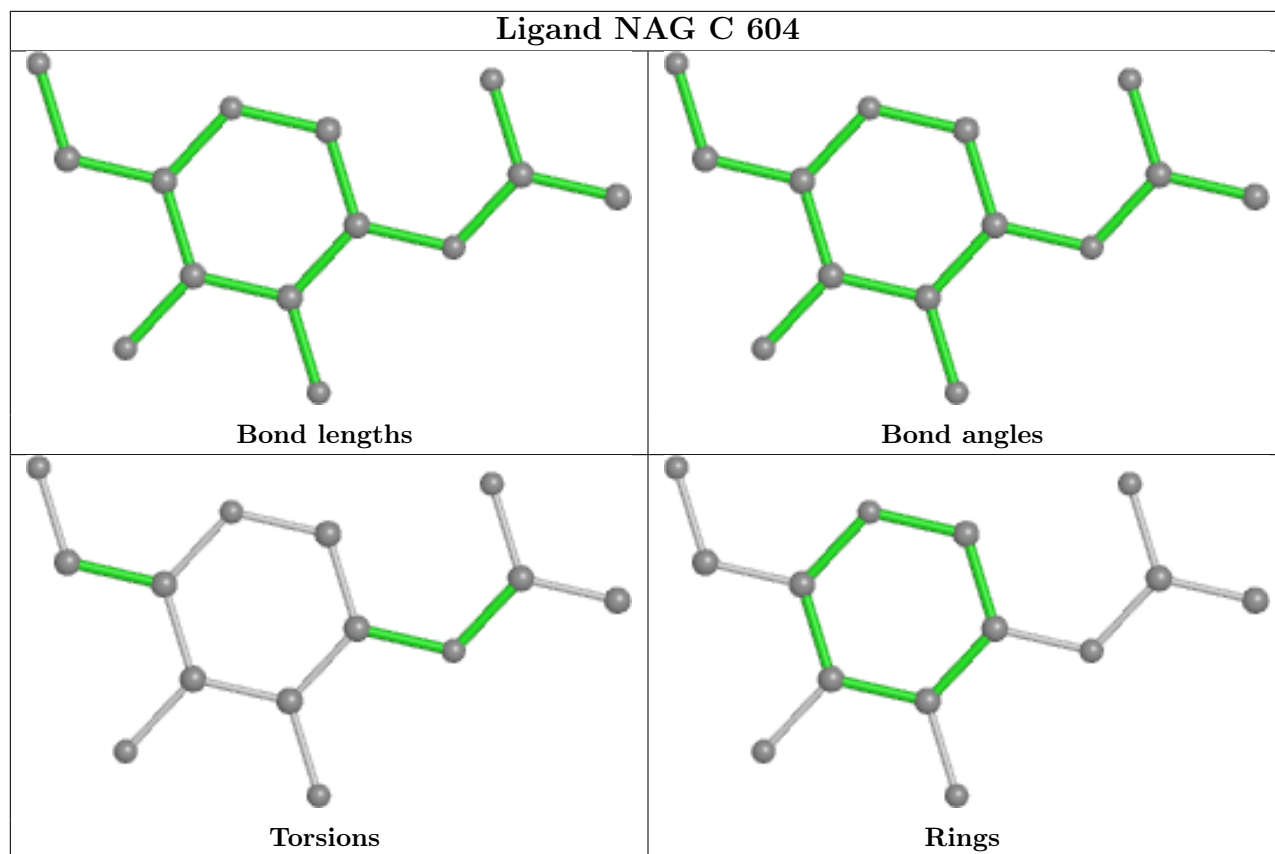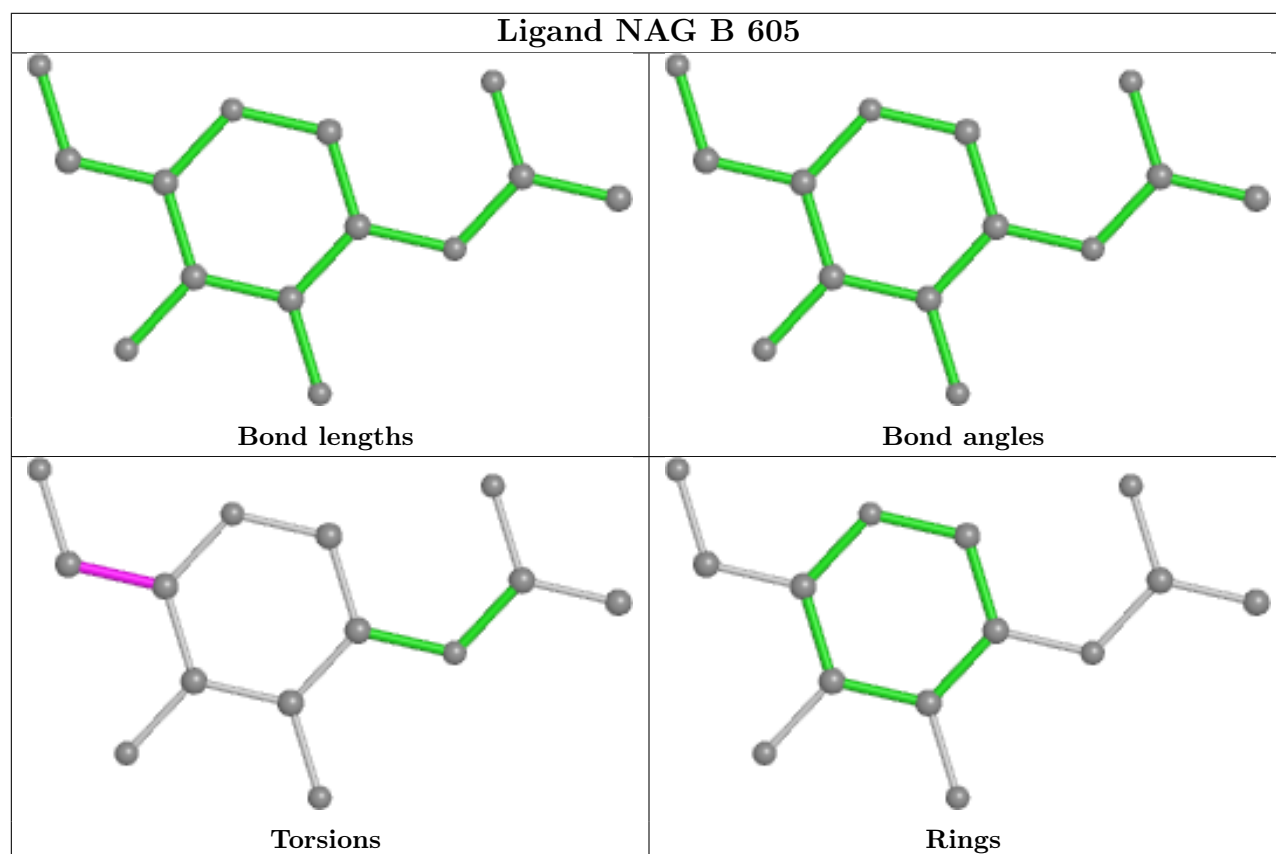No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



**Oligosaccharide Chain D**

Bond lengths      Bond angles

Torsions      Rings
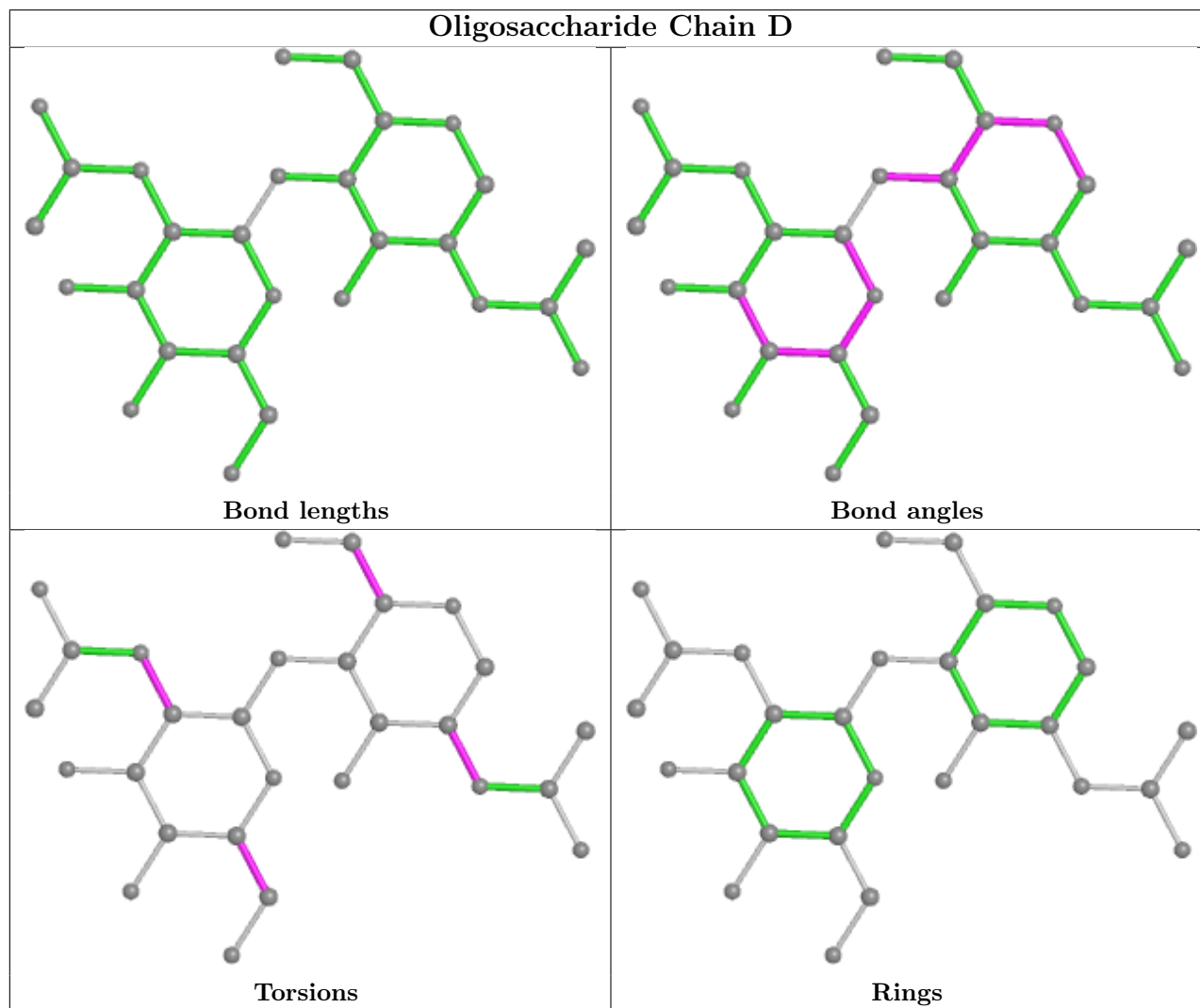
## 5.6 Ligand geometry ⓘ

12 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and

the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|-----|------|--------|------|---------|--------|------|---------|
| | | | | | Counts | RMSZ | #\|Z\| > 2 | Counts | RMSZ | #\|Z\| > 2 |
| 3 | NAG | B | 604 | 1 | 14,14,15 | 2.39 | 2 (14%) | 17,19,21 | 1.62 | 3 (17%) |
| 3 | NAG | B | 603 | 1 | 14,14,15 | 0.51 | 0 | 17,19,21 | 0.52 | 0 |
| 3 | NAG | C | 602 | 1 | 14,14,15 | 0.30 | 0 | 17,19,21 | 1.46 | 2 (11%) |
| 3 | NAG | A | 601 | 1 | 14,14,15 | 1.50 | 3 (21%) | 17,19,21 | 1.28 | 2 (11%) |
| 3 | NAG | C | 601 | 1 | 14,14,15 | 1.85 | 3 (21%) | 17,19,21 | 1.63 | 2 (11%) |
| 3 | NAG | A | 605 | 1 | 14,14,15 | 1.49 | 3 (21%) | 17,19,21 | 1.95 | 3 (17%) |
| 3 | NAG | C | 604 | 1 | 14,14,15 | 0.51 | 0 | 17,19,21 | 0.60 | 0 |
| 3 | NAG | B | 602 | 1 | 14,14,15 | 0.68 | 0 | 17,19,21 | 0.62 | 0 |
| 3 | NAG | C | 603 | 1 | 14,14,15 | 1.12 | 1 (7%) | 17,19,21 | 1.35 | 2 (11%) |
| 3 | NAG | B | 605 | 1 | 14,14,15 | 0.47 | 0 | 17,19,21 | 0.46 | 0 |
| 3 | NAG | B | 601 | 1 | 14,14,15 | 0.57 | 0 | 17,19,21 | 0.50 | 0 |
| 3 | NAG | A | 602 | 1 | 14,14,15 | 0.61 | 0 | 17,19,21 | 1.11 | 1 (5%) |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|-----|------|-------|-----|------|---------|----------|-------|
| 3 | NAG | B | 604 | 1 | - | 4/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 603 | 1 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 602 | 1 | - | 1/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 601 | 1 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 601 | 1 | - | 3/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 605 | 1 | - | 3/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 604 | 1 | - | 0/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 602 | 1 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | C | 603 | 1 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 605 | 1 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | B | 601 | 1 | - | 2/6/23/26 | 0/1/1/1 |
| 3 | NAG | A | 602 | 1 | - | 2/6/23/26 | 0/1/1/1 |

All (12) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|-------|------|------------|----------|
| 3 | B | 604 | NAG | O5-C1 | 6.71 | 1.54 | 1.43 |
| 3 | B | 604 | NAG | C1-C2 | 5.78 | 1.61 | 1.52 |
| 3 | C | 601 | NAG | C1-C2 | 5.21 | 1.60 | 1.52 |
| 3 | A | 601 | NAG | O5-C1 | -4.08 | 1.37 | 1.43 |
| 3 | C | 603 | NAG | C1-C2 | 3.78 | 1.58 | 1.52 |
| 3 | C | 601 | NAG | O5-C1 | -3.77 | 1.37 | 1.43 |
| 3 | A | 605 | NAG | C1-C2 | -3.74 | 1.46 | 1.52 |
| 3 | A | 601 | NAG | C1-C2 | 2.99 | 1.56 | 1.52 |
| 3 | A | 605 | NAG | O5-C1 | -2.86 | 1.39 | 1.43 |
| 3 | A | 605 | NAG | C4-C5 | 2.43 | 1.58 | 1.53 |
| 3 | C | 601 | NAG | C3-C2 | 2.35 | 1.57 | 1.52 |
| 3 | A | 601 | NAG | C3-C2 | 2.18 | 1.57 | 1.52 |

All (15) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|-----|------|-------|------|------------|----------|
| 3 | A | 605 | NAG | C2-N2-C7 | 5.87 | 131.27 | 122.90 |
| 3 | C | 601 | NAG | C2-N2-C7 | 4.85 | 129.80 | 122.90 |
| 3 | C | 602 | NAG | C2-N2-C7 | 4.51 | 129.33 | 122.90 |
| 3 | B | 604 | NAG | C2-N2-C7 | 4.24 | 128.94 | 122.90 |
| 3 | C | 603 | NAG | C1-C2-N2 | 4.04 | 117.39 | 110.49 |
| 3 | A | 601 | NAG | C4-C3-C2 | 4.01 | 116.89 | 111.02 |
| 3 | A | 602 | NAG | C1-O5-C5 | 3.86 | 117.42 | 112.19 |
| 3 | C | 602 | NAG | C1-O5-C5 | 3.12 | 116.42 | 112.19 |
| 3 | A | 605 | NAG | C1-O5-C5 | 3.04 | 116.31 | 112.19 |
| 3 | A | 605 | NAG | O5-C5-C6 | -3.01 | 102.49 | 107.20 |
| 3 | C | 601 | NAG | C1-O5-C5 | -2.80 | 108.39 | 112.19 |
| 3 | B | 604 | NAG | O3-C3-C2 | 2.77 | 115.19 | 109.47 |
| 3 | B | 604 | NAG | O4-C4-C5 | -2.36 | 103.45 | 109.30 |
| 3 | C | 603 | NAG | C2-N2-C7 | 2.27 | 126.14 | 122.90 |
| 3 | A | 601 | NAG | O5-C5-C4 | -2.20 | 105.47 | 110.83 |

There are no chirality outliers.

All (25) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------|
| 3 | A | 605 | NAG | C3-C2-N2-C7 |
| 3 | C | 602 | NAG | C3-C2-N2-C7 |
| 3 | B | 601 | NAG | O5-C5-C6-O6 |
| 3 | A | 605 | NAG | C4-C5-C6-O6 |
| 3 | A | 601 | NAG | O5-C5-C6-O6 |
| 3 | B | 604 | NAG | O5-C5-C6-O6 |

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| Mol | Chain | Res | Type | Atoms |
|-----|-------|-----|------|-------|
| 3 | B | 601 | NAG | C4-C5-C6-O6 |
| 3 | A | 605 | NAG | O5-C5-C6-O6 |
| 3 | B | 602 | NAG | O5-C5-C6-O6 |
| 3 | B | 604 | NAG | C4-C5-C6-O6 |
| 3 | C | 601 | NAG | C1-C2-N2-C7 |
| 3 | C | 603 | NAG | C1-C2-N2-C7 |
| 3 | B | 602 | NAG | C4-C5-C6-O6 |
| 3 | B | 604 | NAG | C8-C7-N2-C2 |
| 3 | B | 604 | NAG | O7-C7-N2-C2 |
| 3 | A | 601 | NAG | C4-C5-C6-O6 |
| 3 | A | 602 | NAG | O5-C5-C6-O6 |
| 3 | A | 602 | NAG | C4-C5-C6-O6 |
| 3 | B | 605 | NAG | O5-C5-C6-O6 |
| 3 | C | 601 | NAG | O5-C5-C6-O6 |
| 3 | B | 603 | NAG | C4-C5-C6-O6 |
| 3 | C | 601 | NAG | C3-C2-N2-C7 |
| 3 | B | 603 | NAG | O5-C5-C6-O6 |
| 3 | C | 603 | NAG | C4-C5-C6-O6 |
| 3 | B | 605 | NAG | C4-C5-C6-O6 |

There are no ring outliers.

3 monomers are involved in 9 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|-----|------|---------|--------------|
| 3 | B | 603 | NAG | 1 | 0 |
| 3 | C | 601 | NAG | 6 | 0 |
| 3 | C | 603 | NAG | 2 | 0 |

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

## Ligand NAG B 604



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAG B 603



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAG C 602



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAG A 601



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAG C 601



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAG A 605



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAG C 604



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAG B 602



Bond lengths



Bond angles



Torsions



Rings

## Ligand NAG C 603


Bond lengths


Bond angles


Torsions


Rings

## Ligand NAG B 605


Bond lengths


Bond angles


Torsions


Rings

## Ligand NAG B 601


Bond lengths


Bond angles


Torsions


Rings

## Ligand NAG A 602


Bond lengths


Bond angles


Torsions


Rings

## 5.7 Other polymers (i)

There are no such residues in this entry.

## 5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

# 6 Fit of model and data ⓘ

## 6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, $95^{th}$ percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

| Mol | Chain | Analysed | <RSRZ> | #RSRZ>2 | | | OWAB(Å²) | Q<0.9 |
|-----|-------|----------|--------|---------|---|---|----------|-------|
| 1 | A | 496/586 (84%) | -0.30 | 4 (0%) | 86 | 82 | 25, 53, 94, 134 | 0 |
| 1 | B | 497/586 (84%) | -0.29 | 5 (1%) | 82 | 77 | 25, 53, 107, 146 | 0 |
| 1 | C | 495/586 (84%) | -0.28 | 5 (1%) | 82 | 77 | 26, 63, 102, 121 | 0 |
| All | All | 1488/1758 (84%) | -0.29 | 14 (0%) | 84 | 80 | 25, 57, 100, 146 | 0 |

All (14) RSRZ outliers are listed below:

| Mol | Chain | Res | Type | RSRZ |
|-----|-------|-----|------|------|
| 1 | B | 348 | ASP | 5.5 |
| 1 | C | 394 | ALA | 4.0 |
| 1 | B | 360 | GLY | 3.3 |
| 1 | B | 347 | VAL | 3.0 |
| 1 | B | 359 | GLN | 2.7 |
| 1 | B | 143 | ARG | 2.5 |
| 1 | A | 172 | ILE | 2.5 |
| 1 | A | 348 | ASP | 2.3 |
| 1 | C | 388 | MET | 2.2 |
| 1 | A | 2 | ALA | 2.2 |
| 1 | C | 2 | ALA | 2.1 |
| 1 | C | 386 | SER | 2.1 |
| 1 | C | 161 | ARG | 2.0 |
| 1 | A | 489 | PRO | 2.0 |

## 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

## 6.3 Carbohydrates ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, $95^{th}$ percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors($Å^2$) | Q<0.9 |
|-----|------|-------|-----|-------|------|------|------------------|-------|
| 2 | NAG | D | 2 | 14/15 | 0.84 | 0.37 | 96,109,116,117 | 0 |
| 2 | NAG | D | 1 | 14/15 | 0.92 | 0.32 | 94,105,115,115 | 0 |

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.
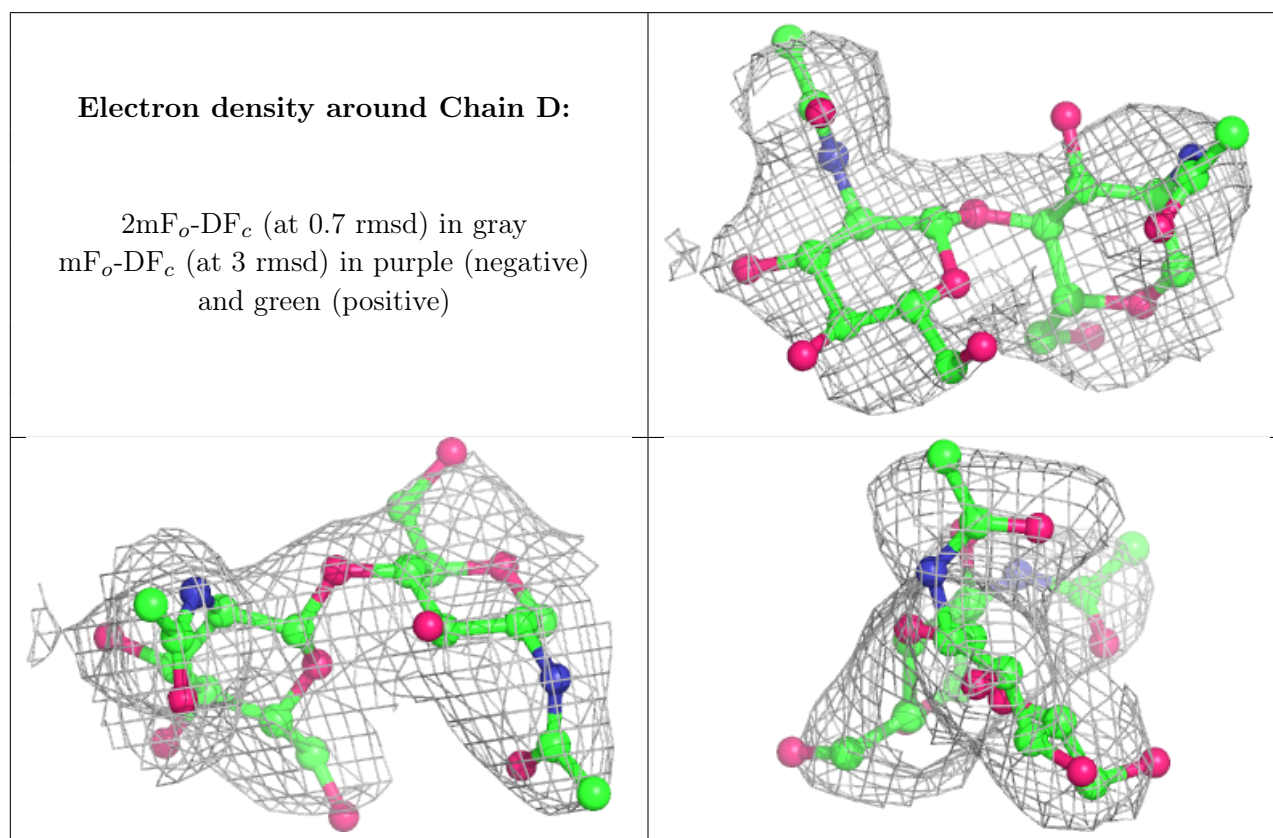
Electron density around Chain D:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative) and green (positive)

## 6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, $95^{th}$ percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors($Å^2$) | Q<0.9 |
|-----|------|-------|-----|-------|------|------|------------------|-------|
| 3 | NAG | B | 602 | 14/15 | 0.73 | 0.67 | 107,110,126,126 | 0 |

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| Mol | Type | Chain | Res | Atoms | RSCC | RSR | B-factors(Å$^2$) | Q<0.9 |
|-----|------|-------|-----|-------|------|-----|------------------|-------|
| 3 | NAG | C | 604 | 14/15 | 0.74 | 0.42 | 105,129,135,139 | 0 |
| 3 | NAG | C | 602 | 14/15 | 0.77 | 0.30 | 95,124,133,136 | 0 |
| 3 | NAG | C | 603 | 14/15 | 0.80 | 0.40 | 107,139,145,145 | 0 |
| 3 | NAG | C | 601 | 14/15 | 0.82 | 0.37 | 99,112,118,124 | 0 |
| 3 | NAG | B | 603 | 14/15 | 0.82 | 0.47 | 108,117,133,137 | 0 |
| 3 | NAG | B | 604 | 14/15 | 0.83 | 0.31 | 85,112,124,131 | 0 |
| 3 | NAG | B | 605 | 14/15 | 0.83 | 0.32 | 74,98,110,117 | 0 |
| 3 | NAG | B | 601 | 14/15 | 0.83 | 0.30 | 73,106,112,116 | 0 |
| 3 | NAG | A | 602 | 14/15 | 0.84 | 0.26 | 78,90,95,103 | 0 |
| 3 | NAG | A | 601 | 14/15 | 0.85 | 0.32 | 98,108,123,128 | 0 |
| 3 | NAG | A | 605 | 14/15 | 0.88 | 0.34 | 94,109,119,128 | 0 |

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around NAG B 602:**

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
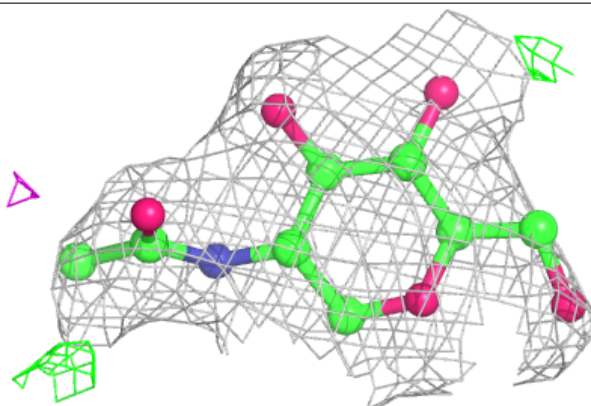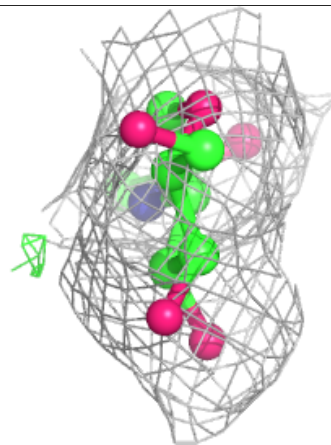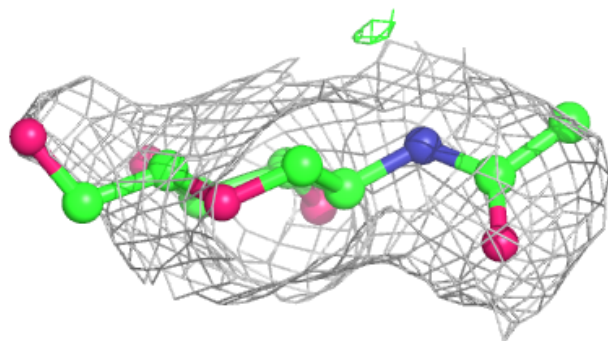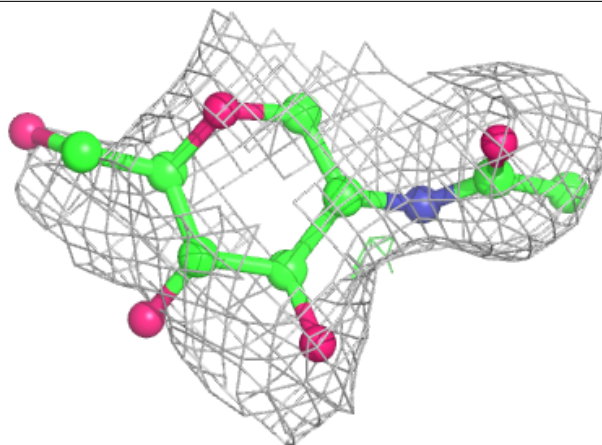$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative) and green (positive)
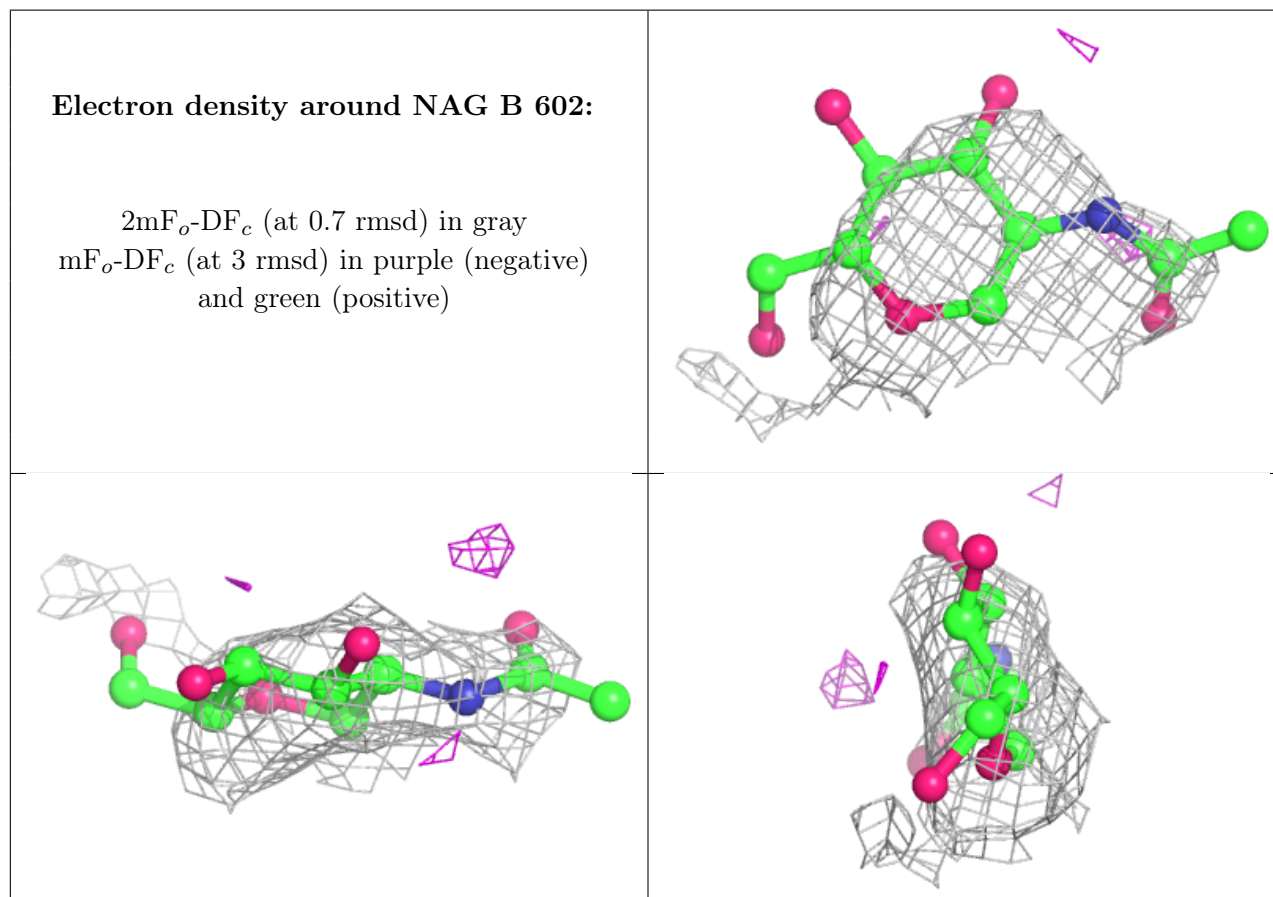
**Electron density around NAG C 604:**

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
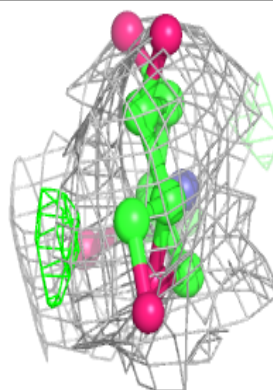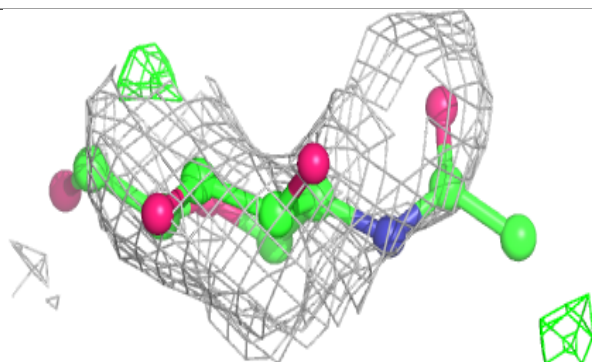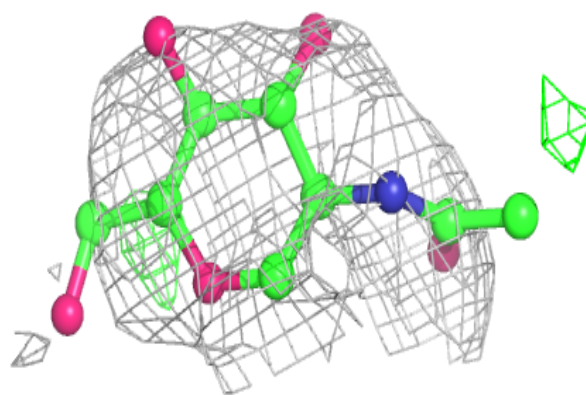


**Electron density around NAG C 602:**

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
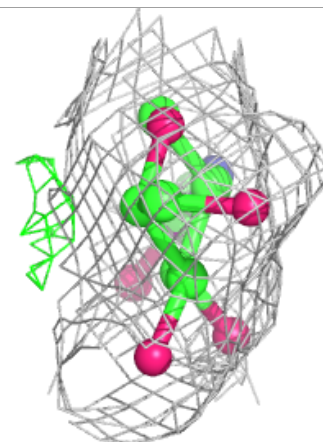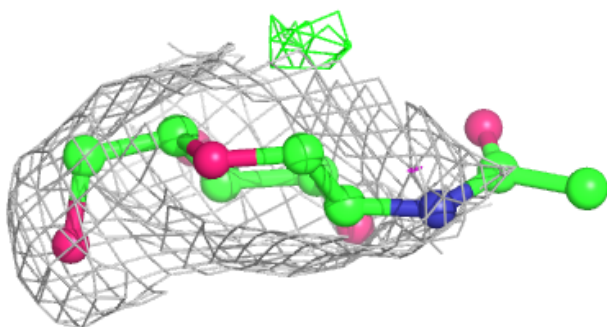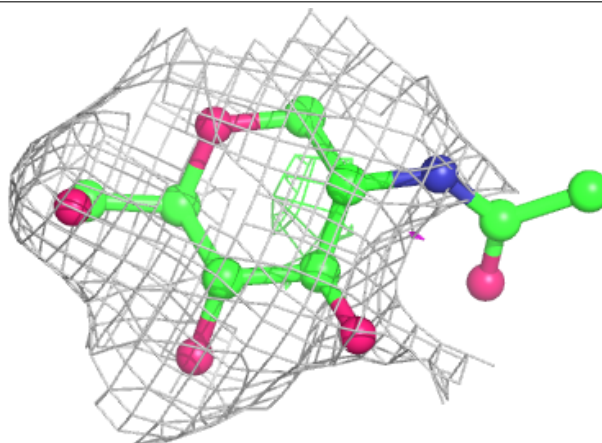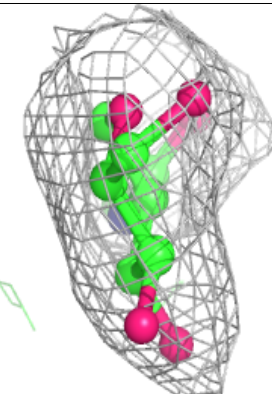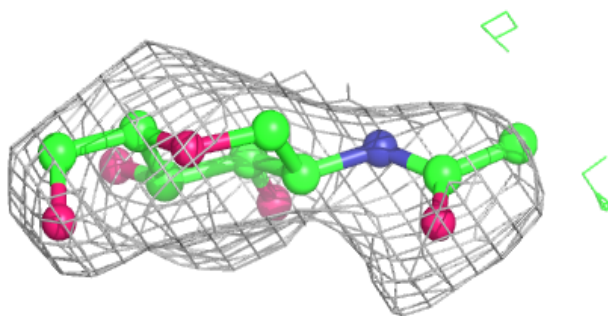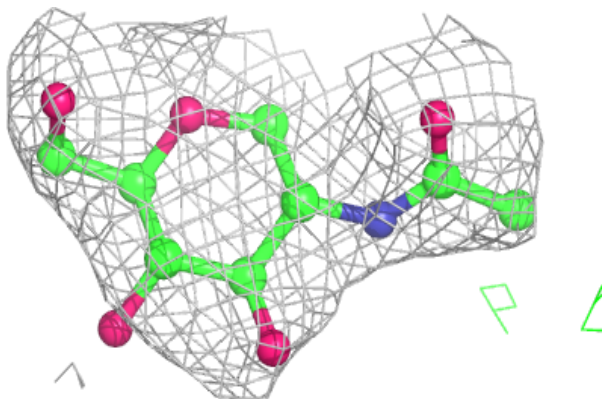
**Electron density around NAG C 603:**

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
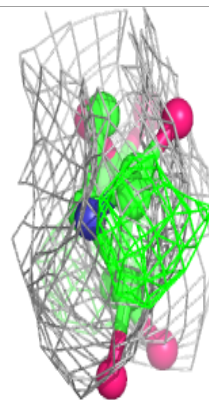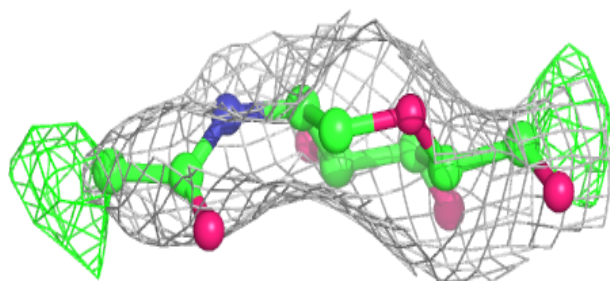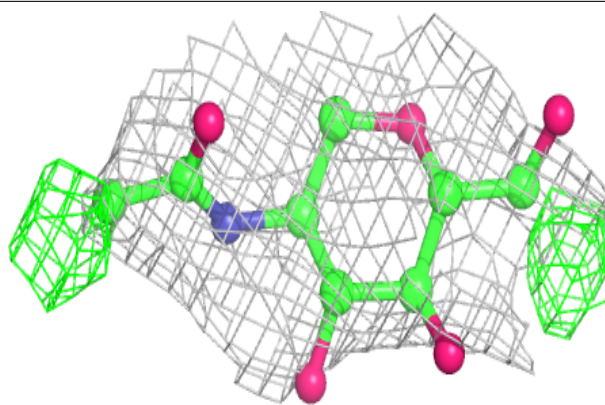


**Electron density around NAG C 601:**

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
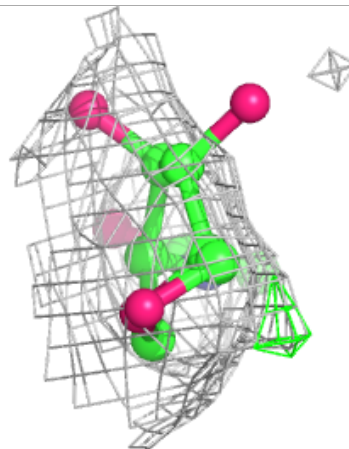$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
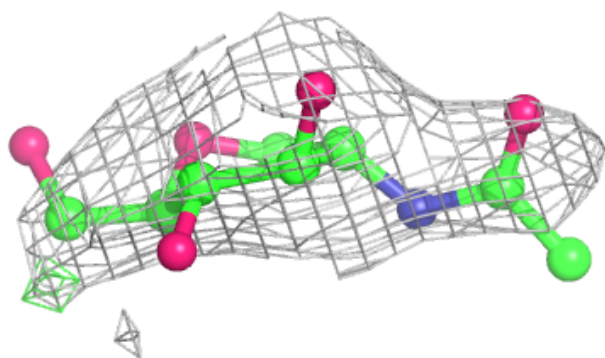and green (positive)
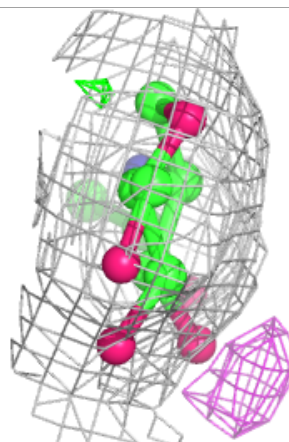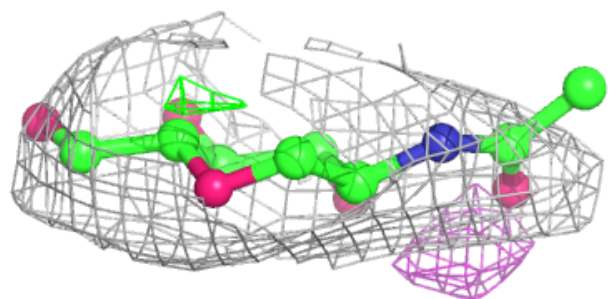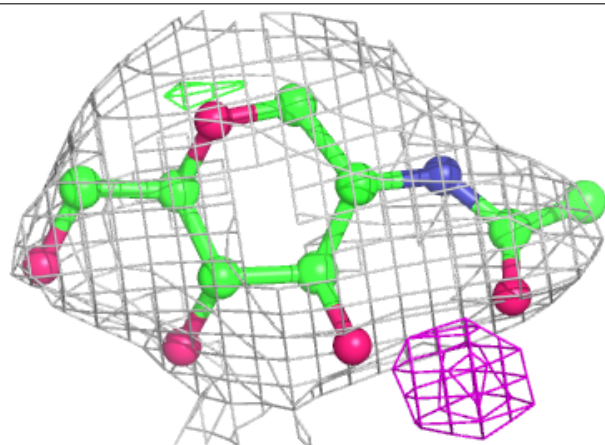
**Electron density around NAG B 603:**

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
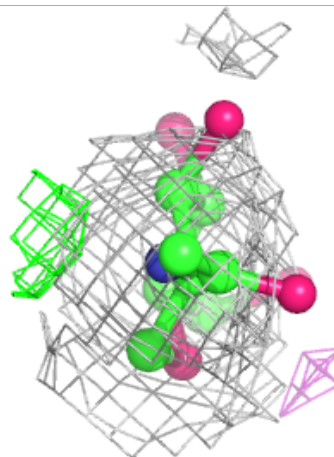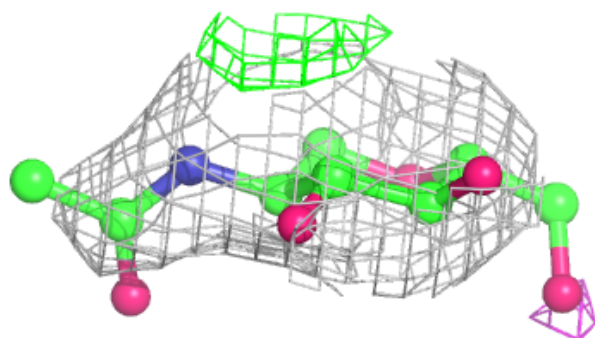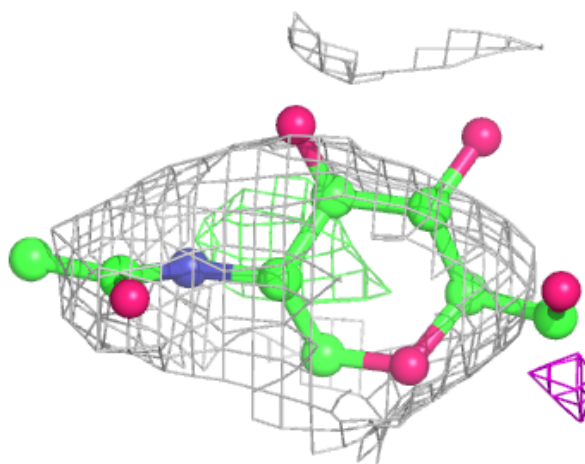
**Electron density around NAG B 604:**

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
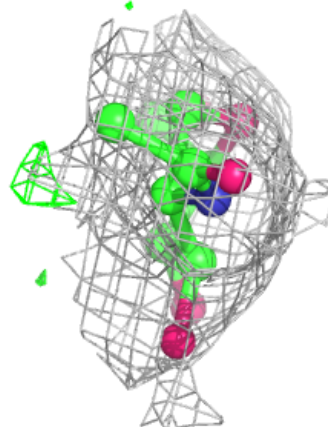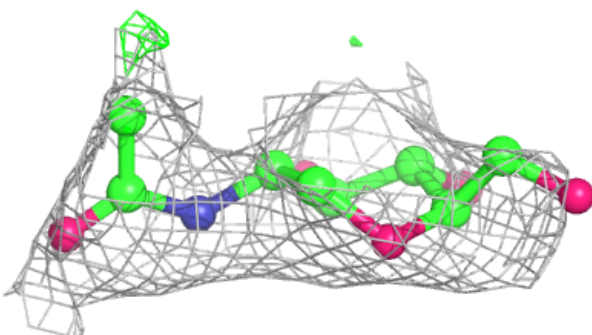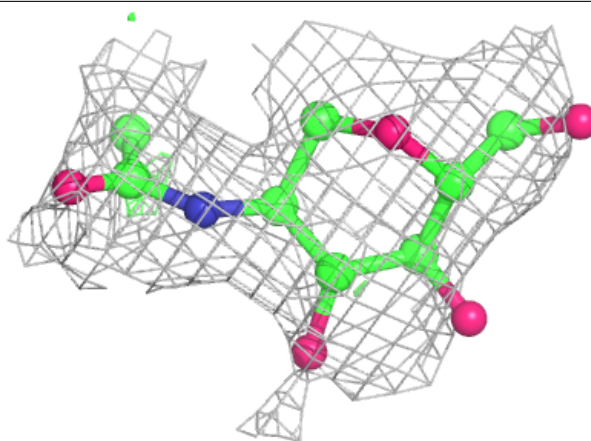


**Electron density around NAG B 605:**

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
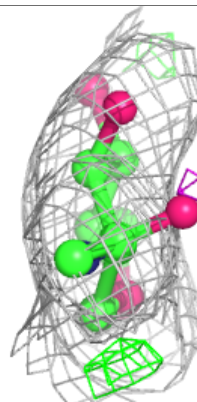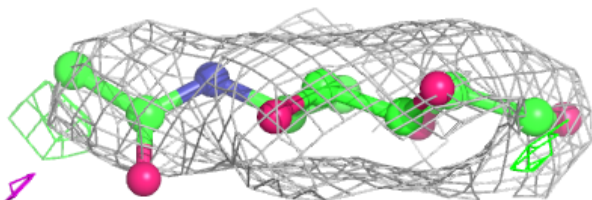
**Electron density around NAG B 601:**

$2mF_o$-$DF_c$ (at 0.7 rmsd) in gray
$mF_o$-$DF_c$ (at 3 rmsd) in purple (negative)
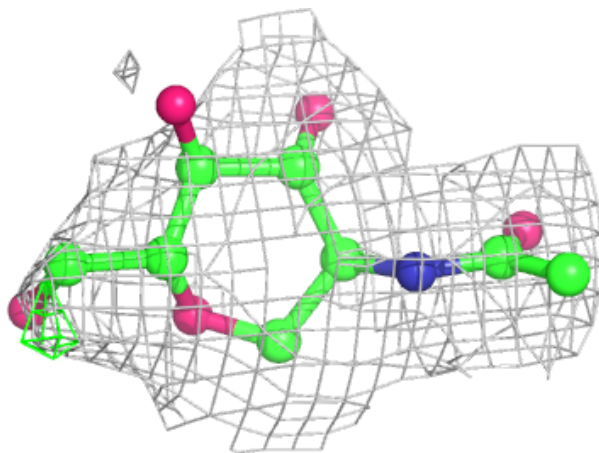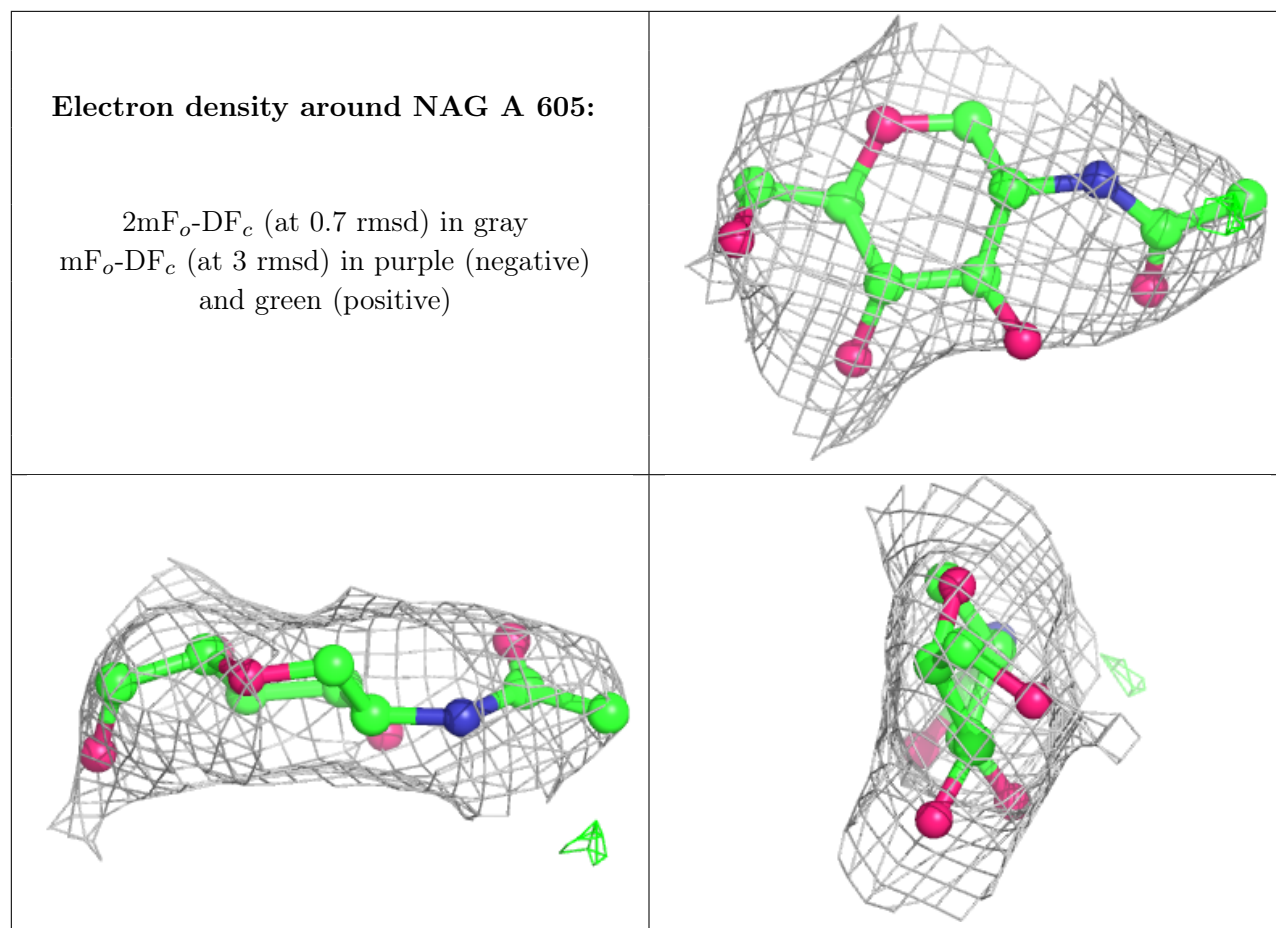and green (positive)



**Electron density around NAG A 602:**

$2mF_o$-$DF_c$ (at 0.7 rmsd) in gray
$mF_o$-$DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around NAG A 601:**

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around NAG A 605:**

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)



## 6.5 Other polymers ⓘ

There are no such residues in this entry.